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Agricultural Economics Bibliography No. 87

# CORN IN THE DEVELOPMENT OF THE CIVILIZATION OF THE AMERICAS

A Selected and Annotated Bibliography

Compiled by
Louise O. Bercaw, Annie M. Hannay and Nellie G. Larson
Under the Direction of Mary G. Lacy, Librarian
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Washington, D. C.
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## FOREWORD

This bibliography contains references to books, pamphlets and periodical articles which show the part corn has played in the development of the civilization of the Americas.

The scope of the bibliography is so broad that it has been impossible to examine all publications which might contain material on the subject. However, in addition to publications dealing specifically with corn many others dealing with the more general subjects of history, travel, botany, geography and Indians were examined. Many valuable references were found through footnote citations in the publications examined. The collections of the Pan American Union Library and the Hispanic Room of the Library of Congress were other important sources of material. With a few exceptions references to the corn myths and ceremonials of the Indians have been omitted. References on the origin of corn have been included, but no attempt has been made to cover this subject.

Since many of the references listed deal with more than one country an alphabetical arrangement by author and title has been followed. Names of countries and states may be found through the author and subject index which accompanies the bibliography.

Call numbers following the citations are those of the U. S. Department of Agriculture Library, unless otherwise noted. "Libr. Cong." preceding a call number indicates that the publication is in the Library of Congress.

Mary G. Lacy, Librarian
Bureau of Agricultural Economics,
U. S. Department of Agriculture

September 1940.

## SOURCES CONSULTED

Card catalogues of the following libraries:

Library of Congress
Pan American Union
U. S. Department of Agriculture
U. S. Department of Agriculture, Bureau of Agricultural Economics
Smithsonian Institution. National Museum

Indexes, Bibliographies, Etc.:


Agricultural Index, 1916 to December 1939. Published by the H. W. Wilson Co., New York, N. Y.

Edwards, Everett Eugene. Agriculture of the American Indians; a classified list of annotated historical references with an introduction. U. S. Dept. Agr. Libr. Bibliog. Contrib. 23, ed. 2, 106pp., processed. Washington, D. C., June 1933.

Edwards, Everett Eugene. A bibliography of the history of agriculture in the United States. U. S. Dept. Agr. Misc. Pub. 84, 307pp. Washington, D. C., 1930.

Edwards, Everett Eugene. References on American colonial agriculture. U. S. Dept. Agr. Libr. Bibliog. Contrib. 33, 101pp., processed. Washington, D. C., September 1938.

Edwards, Everett Eugene. Selected references on the history of agriculture in the United States. U. S. Dept. Agr. Libr. Bibliog. Contrib. 26, ed. 2, 43pp., processed. Washington, D. C., January 1939.

Experiment Station Record, v. 1, 1889-90, to v. 81, no. 3, September 1939. Published by U. S. Department of Agriculture, Office of Experiment Stations, Washington, D. C.

Lacy, Mary G. Corn index.
Unpublished index on file in the library of the Bureau of Agricultural Economics.

Smithsonian Institution. Annual report, 1st, 1847-1937/38. Washington, D. C., 1848-1937/38.

Smithsonian Institution. Bureau of American Ethnology. Annual report, 1st to 48th, 1879/80 to 1930/31. Washington, D. C., 1881-1933.

Smithsonian Institution. Bureau of American Ethnology. Bulletin, no. 1-123. Washington, D. C., 1887-1939.

U. S. Department of Agriculture. Report, 1837-1893. Washington, D. C., 1838-1894.
1837-1861 published as reports of the Patent Office.

U. S. Department of Agriculture. Yearbook of agriculture, 1894-1939. Washington, D. C., 1895-1939.

# CORN IN THE DEVELOPMENT OF THE CIVILIZATION OF THE AMERICAS

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1. Acosta, José de. The natural and moral history of the Indies. Reprinted from the English translated edition of Edward Grimston, 1604, and edited with notes and an introduction, by Clements R. Markham. 2v. London, Printed for the Hakluyt society, 1880. (Works issued by the Hakluyt society. No. LX-LXI) Libr. Cong. G161.H2.

   V. 1, ch. XVI, is entitled: Of the Indian Bread, and of Mays. The cultivation and uses of maize are described and its value as a food for man and beast is stressed.

   The Library of Congress has also a Spanish edition of this book published in 1894 which is a reprint of the first edition published in Seville in 1590.

2. Adair, James. Adair's history of the American Indians; edited under the auspices of the National society of the colonial dames of America in Tennessee by Samuel Cole Williams. 508pp. Johnson City, Tennessee, Watauga press, 1930. Libr. Cong. E77.A22

   Contains a reproduction of the original title page, London, 1775.

   In his General Observations on the North American Indians, pp. 405-480, the writer describes their agricultural practices, especially those relating to corn culture, and states that "Corn is their chief produce, and main dependence," p. 437. The methods of cooking the corn, and of making bread and baking it are described.

   In the various other essays of this volume are scattered references to corn growing by many tribes, from which it may be deduced that corn was widely cultivated and commonly used.

3. Albes, Edward. Maize - the greatest of American food products. Pan Amer. Union. Bul. 43: 33-54. July 1916. 150.9 M76

   Reprinted in U. S. Dept. Int. Bur. Reclam. Reclam. Rec. 8: 278-283. June 1917.

   The history of maize and its wide distribution among the early inhabitants of North, Central, and South America who depended upon it for both food and drink is discussed, as is also the place of corn in the cereal production of the Americas. The many commercial uses for corn are outlined.

4. American husbandry. Containing an account of the soil, climate, production and agriculture, of the British colonies in North-America and the West-Indies; with observations on the advantages and disadvantages of settling in them, compared with Great Britain and Ireland. By an American. 2v. London, Printed for J. Bew, in Pater-noster-Row, 1775. 31 Am3

These volumes contain a number of references to the growing of maize. Among them are the following in Volume I:

On pp. 50-52 of ch. V, which has to do with the agriculture, climate, soil, etc., of New England, there is an account of maize, "which is the grand product of the country, and upon which the inhabitants principally feed." The method of cultivating it, especially by "ploughing cross and cross between the plants" is described. The writer deplores the fact that this method is not practiced by all cultivators. "Had Mr. Tull, the inventor of the horse-hoeing husbandry, known it, or rather had he lived in a country where it was commonly cultivated, he would have exhibited it particularly as the plant of all others which was most formed for his method of culture." The writer even gives the cost of cultivation per acre.

Maize is also discussed on pp. 76-78. The cultivation of maize in New York is discussed on p. 99, and in New Jersey, on p. 134.

The preference for wheat over maize by the people in Pennsylvania is discussed on pp. 160-161.

Maize in eastern Louisiana is discussed on pp. 76-77 of volume 2. "Maize was not only cultivated by the Indians in small quantities for their subsistence during a part of the year, but also by the French as an article of considerable exportation to the sugar islands; it was here found to thrive better on a black and light earth than on a strong one." The advantage of planting maize "in the woods, thick set with cane" is brought out.

5. Amsden, Charles. The first farmers of America. Stone & Webster Jour. 47(1): 69-81. July 1930. 290.8 St6

Reprinted from The Masterkey July, Aug. 1929.

This article contains a discussion of the agriculture of the aboriginal inhabitants of the western hemisphere. The following extracts have been quoted from the article: "That agriculture is the stepping-stone to civilization is nowhere more clearly demonstrated than here in America... Agriculture is one of the most clearly defined culture traits of the American Indian...It is said of the civilized world today that progress depends upon education; it might just as truly be said of primitive America that progress depended upon agriculture." - pp. 69-70.

"The Inca Empire of Peru furnished the most notable example of agricultural development in the New World: a state in which the cultivation of the soil was the dominant factor of economic and social life... Corn, or maize, was the staple food-crop, closely rivaled however, by the potato, another of the outstanding contributions of the American Indian to the world's food supply...Corn seems to have had more uses

in the Inca Empire than in any other agricultural area in which it was found. When fully natured and dried, it was ground into meal for bread after removal of the hull by soaking in lye-water. Green, it was eaten roasted, while an edible oil was extracted from the immature grain, and a syrup was made from the juice of the green stalks of the plant. Thus principal corn products of today are of pre-Columbian origin. To the 'wasteful, lazy Indian' goes credit for discoveries from which the whole world benefits today." - p. 72.

"From the very beginning of colonization in the New World, the white man profited greatly by the agricultural knowledge of the Indian. The Plymouth Colony gained its foothold in New England, and sowed those seeds of European dominion from which grew the United States of America, - through the grace of Indian agriculture. Friendly Indians showed the Pilgrim Fathers how to grow corn and beans... Before their own crops ripened, the Colonists lived on corn provided by the natives. Without the help of the Indian farmer, the first Thanksgiving Day would have been long delayed. Farther south, in the Virginia Colony, the Indian farmer contributed no less notably to the white man's supremacy in North America, and hence to his own speedy effacement from the scene of his activities. It is recorded that Captain John Smith averted starvation in the first year of the Colony's existence by an opportune barter for Indian corn. Corn provided the staple food of the colony... the Indian farmer has in reality changed the staple foods and the daily habits of far distant nations, and radically altered the economic structure of the entire civilized world. His centuries of patient labor have borne fruit in lands unknown to him, and immeasurably quickened the stride of civilization across the globe." - pp. 79-80.

6. André, Eugène. A naturalist in the Guianas. With a preface by Dr. J. Scott Keltie. 310pp., illus. New York, C. Scribner's sons; London, Smith, Elder & co., 1904. Libr. Cong. F2313.A55

In describing a visit to La Prision the author describes the method of making cakes of Indian corn which form the bread of the peasantry, p. 123. Another method of preparing corn is described on p. 302.

7. Atkinson, Alfred, and Wilson, M. L. Corn in Montana; history, characteristics, adaptation. Mont. Agr. Expt. Sta. Bul. 107, 128pp. Bozeman, 1915.

Bibliographical footnotes.

Pt. II, pp. 24-49, which is entitled Historical, shows the important place which corn held among the tribes north of the so-called corn belt. Contents of this Part are: Origin of corn; corn growing of northeastern Indians; corn growing of the north central Indians; Upper Missouri Indians (the Arikara, the Mandan, Hidatsa); history of early Montana corn growing.

The following is quoted from the Summary of the bulletin, p. 128: "A search for types and varieties of corn, growing under essentially the same climatological environments as are furnished by a large portion of Montana's tillable land, has revealed the important and

interesting fact that a highly developed and really scientific system of corn culture has long been practiced by the northern tribes of American Indians in general, and by the Upper Missouri tribes in particular. The latter tribes - Mandan, Hidatsa, and Arikara - were growing extensive crops of corn along the Missouri River in what is now western North Dakota when visited by the first explorers nearly two hundred years ago. The corn grown by these Indians furnishes a basis for study of the characteristics of corn adapted to this climate and a foundation for the upbreeding and development of varieties derived from them."

8. Attwater, H. P. Natural history of the corn plant. Tex. Dept. Agr. Bul. 4, p. 7. Austin, 1908. 2 T312B

The three paragraphs of this short article are extracts from an address delivered before the Corn Growers' Association during the ninth session of the Texas Farmers' Congress. The first two paragraphs follow in full:

"Maize, or Indian corn, is said to have had its origin in tropical America, and was originally a giant cereal grass. It was unknown to Europe prior to the discovery of America. Indian corn has been cultivated from remote antiquity by the Peruvians and Mexicans, by whom it was held in great veneration. In some of the museums of antiquities there is evidence to show that through uncounted centuries of patient toil the ancient races of Central America have developed this plant from some primitive form to the condition in which we received it at their hands, and the agricultural world owes a debt of gratitude to these aboriginal people for the part they took in the development of a wild plant to one which today produces the staple grain of the warmer parts of America, and which has been introduced into Southern Europe, India, Australia and other parts of the world chiefly as food for both man and animals.

"Indian corn is said to be the most advanced and highest type of all our cultivated plants in existence. In its present form it seems to bear on one side the impression of infinite creative energy and skill and on the other just as plainly the impress of man's modifying hand. This is so true that if the race of man were to be blotted from existence at once, but the climatic and other conditions to remain the same as they are, Indian corn could not survive him a single year. His cooperation has made it what it is, and its death must follow his. The now naked seed would rot in the soil, and the plant has lost the power, if it ever possessed it, of reproduction by root stalks or buds, as in the case of sugar cane."

9. Balcomb, Ernest Elwell. The North Carolina corn bulletin. [N. C. Dept. Pub. Instr.] Bul. 24, 80pp. Raleigh, 1915. 59 B18

This is an elementary bulletin intended for the use of teachers in the public schools. It contains brief information on corn growing, judging, seed testing, etc., and one page on the importance of corn and its products.

"Prof. Warren, in his 'Elements of Agriculture,' suggests that had it not been for the great development of the middle western states, owing to their magnificent crops of corn, the history of the United States might have been different. Corn is the greatest single crop that the United States harvests. Its greatest value to the human race as a food is not the enormous amount that is used directly as corn bread, green corn, etc., but it is the millions of bushels fed to cattle, hogs, sheep, poultry, etc., which are to be used in the form of meat, eggs, butter, milk, etc. It is the food preëminent for fattening stock.

"The early settlers of the United States were doubtless saved many times from starvation by the corn they procured from the Indians or what they themselves grew." - p. 15.

10. Bandelier, Adolph Francis Alphonse, and Hewett, Edgar Lee. Indians of the Rio Grande Valley. 274pp. Albuquerque, University of New Mexico press, [1937] (Handbooks of archeological history) Libr. Cong. E78.S7B3

In many places throughout the volume are short references to corn; several of them being extracts from the journals of the Spanish explorers. Consult the index for exact pages.

11. Barnes, Will C. The prehistoric corn belt. "Who's who in American grasses." Amer. Forests 33(406): 604-607. Oct. 1927. 99.8 F762

Gives something on the place of corn in the civilization of the Cliff dwellers.

12. Bartlett, John Sherren. Maize, or Indian corn. Its advantages as a cheap and nutritious article of food. With directions for it's use. 24pp. London, Wiley & Putnam, 1846. Libr. Cong. TX558.M2B3

"First published as a portion of the author's A letter to the Right Honourable Baron Ashburton...on the importance of the corn and flour trade with England, via the river St. Lawrence...New York, 1842." - p. 5.

Not examined.

13. Bartlett, Katharine. Prehistoric Pueblo foods. Museum of Northern Arizona (Flagstaff) Museum Notes 4(4): 1-4. Oct. 1931. Libr. Cong. F806.M97

A considerable part of this article is devoted to corn. In conclusion the writer states "...we may conclude that the old Southwest inhabitants had all the necessary elements for a fairly balanced diet as recognized by our nutrition specialists today.

"A great change was brought about in the lives of the postulated Nomadic people who first lived here, when maize and squash were introduced. When several varieties of corn and beans came into use with the beginning of the Pueblo period, the mode of life was completely agricultural and sedentary, allowing the development of a high state of culture - which had somewhat declined by the time the Spanish came in 1540, but elements of which still persist in those Pueblos which have not had much contact with white civilization."

14. Basaldua, Florencio de. Agricultura; cultivo del maïz; estudio sobre cultivo y siega del maïz, y utilización del tallo en la provincia de Buenos Aires. 91pp. La Plata, 1897. 59.22 B29

Brief remarks on the origin of maize, the etymology of the word, the prehistoric cultivation of maize in the Antilles, and the influence of the cultivation of maize on the conquest and civilization of America.

15. Bates, Erl. Iroquois gold or maize. Cornell Countryman 20(1): 7-9. Oct. 1922. 6 C81

"Woven into the very fabric of Indian philosophy, religion, and folk lore, is found what all tribes except those of the non-agricultural areas call the great gift of the Great Spirit." - p. 7.

"This has been the mainstay of the diet of the red man for ages and from it comes his bread, his cake, and his soup. Mixed with beans, it is his and our succotash. Dried and made into a paste with honey, it provided the hunter with food on his long train after the deer and the bear... This maize saved our Pilgrim Fathers from starvation the first winter at Plymouth, and were it not for it, Hennepin, Marquette, Joliet, and LaSalle, would have been unable to plant the flag of France at Niagara, Mississippi, and our inland seas. European white men came to this continent seeking gold, the Iroquois gave them their gold, their maize, and the white men found at length that the gold of the Iroquois was more valuable and more worthwhile human efforts than the metal that old Europe pawned her jewels, her men and her all, to obtain. This maize was the medium of exchange in the early days and the Oneidas brought three hundred bags of it to feed Washington's starving army at Valley Forge... The Indian 'Buck' corn was planted by the pioneer whites and became our 'York State Flint,' and it was the sight of this corn growing six feet high on the banks of the Susquehanna that induced the members of the Sullivan expedition to sell their military grants to enter what is now Tioga, Chemung, Broome, and Tompkins Counties." - p. 9.

16. Bates, Erl A. What the corn plant taught the Indian. Cornell Countryman 27(2): 42-43. Nov. 1929. 6 C81

The Iroquois of New York were corn growers and migrants from the Southwest who probably brought their corn with them. "It must be remembered that all primitive civilizations were half starved ones. These Indians of New York rose above their fellows in statesmanship, in community organizations, and in religious advancement because they satisfied the law of self preservation earlier and to a more marked degree than the other tribes. The kernel of the questions raised is found in the kernel of their food staple, Indian Corn, and their ability to adjust this tropical plant to the soil and climate of the Empire State which they call their 'Promised Land.'...

"Corn is the 'Great Gift' of the Great Spirit to the red man and when one thinks in terms of agriculture as the basic industry, and corn, our foundation crop, one can readily understand why the designation was true to the Indian and is to all of us in America today.

Corn was the chief food staple of the Indians and it is called by the name 'our life'...

"Indian corn saved the pilgrims from starvation, it made possible the settlements of William Penn at Philadelphia and the Dutch burghers along the Hudson. It was the chief crop of Sir William Johnson's colonists in the Mohawk Valley, and the cow, the pig and the chicken of the settler in central and western New York lived on this Indian gift to the soil of New York. Corn was the cornerstone of our New York Indian and white pioneer civilization...We owe much to the Indian but our larger debt is surely his gift to us of Indian corn." - p. 43.

17. Bates, Henry Walter, ed. Central America, the West Indies and South America. With ethnological appendix by A. H. Keane. Ed. 3, 571pp. London, Edward Stanford, 1885. (Stanford's Compendium of geography and Travel based on Hellwald's 'Die Erde und ihre Völker?)
Libr. Cong. F1409.B32

In Venezuela is found "maize, of which there are white, yellow, violet, red, and black varieties." - p. 306.

18. Becker, Lothar. Der türkische weizen und der mais in geschichtlicher hinsicht. Die Natur (N.F.)37: 97-99, 124-127, 133-135, 160-163, 186-188, 223, 236, 247-248. 1888. Libr. Cong. Q3.N2

Deals with the controversy about the origin of maize and quotes from well known authors.

19. Beede, A. McG. [Corn-raising Indians.] 3pp. 1916. Pam. Coll. - Folio 59B

Photostat copy of letter to Mr. H. Howard Biggar, in which there is some description of the corn raising, harvesting, and cookery activities of the Sioux and other tribes of Indians.

20. Belt, Thomas. The naturalist in Nicaragua. 306pp., illus. London, J. M. Dent & sons, ltd.; New York, E. P. Dutton & co., inc. [1928]
Libr. Cong. AC1.E8 no. 561

Half-title: Everyman's library, ed. by Ernest Rhys. Travel & topography [no. 561].

"First published in this edition 1911. Reprinted 1928."

Describes a visit to Pital, "a scattered settlement of many small thatched houses, close to the borders of the great forest, on the edge of which were clearings, made for growing maize, which is cultivated entirely on burnt forest land." The preparation of the land and the cultivation and harvesting of maize are described. Reference is made to the finding of maize in Peru and in Mexico. "When Florida and Louisiana were first discovered, the native Indian tribes all cultivated maize as their staple food; and throughout Yucatan, Mexico, and all the western side of Central America, and through Peru to Chili, it was, and still is, the main sustenance of the Indians. The people that cultivated it were all more or less advanced in civilisation; they were settled in towns; their traders travelled from one country to another with their wares... It is likely that these maize-eating peoples belonged to closely affiliated races. In the West

India Islands they occupied most of Cuba and Hayti...From Cape Gracias á Dios southward, the eastern coast of America was peopled on its first discovery by much ruder tribes, who did not grow maize, but made bread from the roots of the mandioca (Manihot aipim); and still in British Guiana, on the Lower Amazon, and in north-eastern Brazil, farina made from the roots of the mandioca is the staple food. Maize has been introduced by the Portuguese, but it has no native name, and is used mostly for feeding cattle and fowls, scarcely at all for the food of the people. This fundamental difference in the food of the indigenes points to a great distinction between the peoples." The preparation of bread from maize in Central America is described. - pp. 44-47.

"The ancient Indians of Nicaragua were an agricultural race, their principal food then, as now, being maize; and in all the ancient graves, the stone for grinding corn is found placed there, as the one thing that was considered indispensable." The cultivation of maize is described. - pp. 146-147.

Contains other scattered references to maize.

21. Bement, C. N. History of Indian corn; its origin, its culture, and its uses. N. Y. State Agr. Soc. Trans. 13: 321-353. 1853. 2 N48T 1853

The writer tells something of the history and origin of maize, points out its superior qualities as a cereal, gives its properties and composition, describes numerous varieties, uses and cultivation, and gives "recipes for cooking corn in all its various ways."

"All the early historians, both of North and South America, give the strongest evidences that this grain is of American origin, and speak of it as having constituted a great part of the food of the Indians from time immemorial...Thus we see it was cultivated in America long before the discovery, and formed a most important article of food for centuries." - p. 21.

22. Benedict, Francis Gans, and Steggerda, Morris. The food of the present-day Maya Indians of Yucatan. Carnegie Inst. Wash. Contrib. to Amer. Archaeol. 3(18): 155-188. 1937. 500 C21C v. 3, no. 18.

Notes the extent to which maize still forms a part of the diet of the Maya Indians of Yucatán. "On the average, 73 percent of the daily energy intake of these Indians comes from maize."

23. Bengtson, Nels August, and Van Royen, Willem. Fundamentals of economic geography. 802pp. New York, Prentice-Hall, inc., 1935. Libr. Cong. HF1025.B43

Selected references at end of each chapter; List of principal publications consulted, pp. 765-783.

See particularly sections: Importance of corn to American colonists, and Westward expansion of corn production in the United States, pp. 612-614.

24. Bennett, Wendell Clark, and Zingg, Robert M. The Tarahumara, an Indian tribe of northern Mexico. 412pp., illus. Chicago, Ill., The University of Chicago press [1935] (The University of Chicago publications in anthropology. Ethnological series) Libr. Cong. E99.T3B46

The Tarahumaras are said to form the largest tribe of American Indians north of Mexico City, and to have "maintained one of the simplest of aboriginal American cultures, little modified by European contacts." - Preface.

Chapter III is entitled Agriculture and Food.

"The fundamental agricultural patterns of the Tarahumara are simple, and fit into the general Mexican background. The staple products are: maize (Zea mays; suunúku), beans...and squash...

"The agricultural technique shows variation from the typical 'milpa system.' A flat bit of ground is cleared. The trees are felled and burned when they are dry. A fence is built around the clearing, which becomes a permanent field (gawírali), fertilized every year or two... Corn and squash are raised in these fields. The nitrogenous property of beans is utilized by the Tarahumaras, who often plant these legumes in the cornfields to enrich the soil." - p. 26.

The ploughing, planting, cultivation, and harvesting of corn and the various foods prepared from corn are described. "It appears that no possible way of utilizing the corn has been overlooked...The Tarahumaras usually have a plenitude of corn, and even in bad years they suffer less than their Mexican vecino." - pp. 29-36.

Corn-drying structures are described on pp. 58-60, and the green-corn fiesta on pp. 282-283.

It is pointed out that "our first archaeological material from the country of the Tarahumaras is the Basket-Maker phase, followed, apparently, by a Cave-Dweller phase which extends down to the present time. Corn was present in the Basket-Maker phase, but beans and squash were absent...Corn ears were placed near the mouth in burials, indicating that corn was eaten." - p. 357.

"The Cave-Dweller archaeological evidence discloses the pattern of corn, bean, and squash agriculture. It is of prime ecological importance." - p. 359.

Among the principal changes in Cave-Dweller technology is noted "the introduction and use of pottery and the metate-mano in the preparation of corn." - p. 359.

"The emphasis on agriculture to the exclusion of most other occupations is a recent development. It is also true that the introduction of the ox and plow, manure fertilizer, and steel tools have wrought tremendous advances in agriculture. New fruits and grains have amplified the possibilities. However, the agricultural complex, particularly that of corn-bean-squash, has such a complete series of terms, all of old origin, that we must come to the conclusion that the complex itself must be old. Most of the Tarahumara words for the parts of the corn plant are of good Uto-Aztekan origin. The archaeological study reveals corn in the Basket-Maker-type phase, beans and squash in the Cave-Dweller phase. The rancheria farming is also of old pattern. The planting-stick is still used for corn, as well as to break up new ground for beans in the upland fields." - p. 376.

25. Beverley, Robert. The history and present state of Virginia, in four parts... By a native and inhabitant of the place. Variously paged. London, Printed for R. Parker, at the Unicorn, under the Piazza's of the Royal-exchange, 1705. Libr. Cong. F229.B57 - Office

A description of Indian corn and the method of cultivation by the Indians is given on pp. 28-30 of the second part of this volume.

"This Indian Corn was the staff of food, upon which the Indians did ever depend; for when sickness, bad weather, war, or any other ill accident kept them from hunting, fishing and fowling; this, with the addition of some peas, beans, and such other fruits of the earth, as were then in season, was the families dependence, and the support of their women and children.

"There are four sorts of Indian corn, two of which are early ripe, and two, late ripe; all growing in the same manner...Each ear is wrapt up in a cover of many folds, to protect it from the injuries of the weather...oftentimes the increase of this grain amounts to above a thousand for one." The late ripe corn is described as being of two kinds. The one with the plump, smooth grains is called Flint-Corn; the other which has "a larger grain, and looks shrivell'd with a dent on the back of the grain, as if it had never come to perfection" is called "She-Corn. This is esteemed by the planters, as the best for increase, and is universally chosen by them for planting; yet I can't see, but that this also produces the Flint-Corn, accidentally among the others... but whence they had their Indian corn, I can give no account; for I don't believe it was spontaneous in those parts."

Chapter IV of Book 3 describes the Indians' Cookery and Food which include corn.

"The bread in gentlemen's houses, is generally made of wheat, but some rather choose the Pone, which is the bread made of Indian Meal. Many of the poorer sort of people so little regard the English grain, that although they might have it with least trouble in the world, yet they don't mind to sow the ground, because they won't be at the trouble of making a fence particularly for it. And therefore their constant bread is Pone, not so called from the Latin, Panis, but from the Indian name Oppone." - pp. 55-56 of Book 4. The making of beer from Indian Corn by the "poorer sort" is recounted on p. 57.

26. Bidwell, Percy Wells, and Falconer, John I. History of agriculture in the Northern United States 1620-1860. 512pp. Washington, D. C., Carnegie institution of Washington, May 1925. (Carnegie Institution. Washington. Publication no. 358) 30.9 B47H

Contains scattered references to corn culture and its significance during the colonial period. The following excerpts are from pp. 9-11. Ch. I, Field Husbandry in the Earliest Settlements:

"The chief grain crop in the North Atlantic colonies from the beginning was the Indian corn or maize. Although unknown to Europeans before the discovery of the New World, it had so many advantages as a pioneering crop that it took precedence immediately over the cereals with which they were familiar and the seed of which they had brought with them... The predominance of maize over other cereals in New England from the beginning is clearly indicated by the contemporary

account of the food of the early settlers. With stewed pumpkins and bean or pea porridge, Indian meal or samp was the staple article of diet. Maize yielded more food per acre than the European grains; its yield was more uniform, being less dependent on the changes of seasons; it ripened early, being ready for harvest in four months from the time of planting, and in some respects it was a labor-saving crop. When planted in the Indian fashion among the stumps or the trunks of girdled trees, it required much less preparation of the soil than the colonists deemed necessary for other cereals...The importance of corn is shown by its early acceptance as a payment in kind for taxes. Corn seems to have served in all the colonies as a preliminary crop before other grains."

In writing of Grain Crops, p. 89, in his chapter on Farming in the Older Settlements, the writer states: "Indian corn, whose importance in the seventeenth century we have already remarked, was still the predominant cereal at the end of the eighteenth century. In New England it was 'the grand product of the country on which the inhabitants principally feed'; Dwight wrote that 'maize is nearly as valuable to this country as all other kinds of corn united, and yields a crop much more extensively useful than any other'...In the Middle States Indian corn was an important source of human and animal food, but, owing to the competition of wheat, a successful cash crop, it did not occupy the predominant position which it held in New England."

In his chapter on Corn, the author chronicles the ever increasing production of maize as the frontier was pushed westward. "Corn could be grown with success on a newly-broken prairie-sod where the wheat crop was rarely successful, and so in the West the prairie land was usually planted to corn the first year. The immigrant who arrived in the spring was thus able with but little care or expense to obtain a crop of corn the first year." - p. 345.

27. Bidwell, Percy Wells. Rural economy in New England at the beginning of the nineteenth century. Conn. Acad. Arts and Sciences. Trans. 20: 241-399. New Haven, Apr. 1916. 500 C76T v. 20

Reprinted in part in Readings in the Economic History of American Agriculture, pp. 173-193, edited by Louis Bernard Schmidt and Earle Dudley Ross. New York, The Macmillan co., 1925.

Partial list of works on agriculture published in the United States before 1815, pp. 392-393.

Bibliography, pp. 394-399.

The importance of Indian corn, pp. 322-323. "Indian corn and rye were the staple grains cultivated on every inland farm. The first might have been called the cornerstone of New England agriculture." The author quotes Rudolph Dickinson's A Geographical and Statistical View of Massachusetts (published in 1813) and Timothy Dwight's Travels in New England and New York (published in 1823).

28. Biggar, H. Howard. The old and new in corn culture. U. S. Dept. Agr. Yearbook 1918: 123-136. 1919. Also published as Yearbook Separate No. 776. 1 Ag84 1918

The value of corn to the early colonists in the United States is brought out in a paragraph on pp. 123-124. It was used as a medium of

exchange as well as a food. The influence of corn upon the Indian is discussed on p. 124. Its cultivation was "a sort of community or cooperative undertaking." Corn was often presented as a gift to other tribes and to the whites and was "the sign of friendship." "Lewis and Clarke...Maximillian and Verendrye, as well as other white traders and explorers, probably would have found it impossible to carry on their operations without the food (principally corn) obtained from the village Indians of the upper Missouri Valley."

Several paragraphs on pp. 132-133 are devoted to the place of corn in the westward movement and the exchange of corn as a surplus product for products of the West Indies and South America. "The progress of invention and commerce was hastened by rapidly increasing supplies of corn and corn-fed animals."

"The increasing production of corn and the consequent increase in hogs and cattle developed the packing-house industry." - p. 133.

Corn and the struggle for democracy, pp. 135-136. The following is quoted from this section: "Valuable, even in the remote past, as a sustainer of life among primitive peoples in peace and war, the importance of corn in the world's affairs becomes more and more manifest with each decade of time. Moving westward and northward as its merits became better recognized, its growth in production is closely associated with the building of canals, railroads, our national highways, and our commercial supremacy. Because of the manifold uses of every part of the plant, the production of corn is closely linked with the development and perpetuation of many great industries. Because of its wonderful adaptation to conditions, it is now grown with success in every State of the Nation, from sea level to lofty plateaus. In acreage, in multiplicity of uses, in production, and in value it exceeds any other cultivated crop. A corn-crop failure of any extent affects our supply of meat, lard, butter, and imports and exports. Its use as substitute for wheat made it possible to release exceptionally large shipments of wheat to Europe, to supply the Allies and our own armies."

29. Biggar, H. Howard. Trailing king corn. Old tribesmen tell true story of Indian maize. Wallaces' Farmer 55(40): 1585, 1597. Oct. 4, 1930. 6 W15

The writer reports his experiences and findings on a journey through the Middle West in quest of information on primitive corn-growing practices.

"To the Indian, corn was life. It was his main food plant in the agricultural regions. In religious rites and ceremonies, the corn plant always played a prominent part." - p. 1585.

30. Birdsall, W. R. The cliff-dwellings of the cañons of the Mesa Verde. Amer. Antiquarian 14(3): 123-138. May 1892. Libr. Cong. E51.A51

In describing the contents of these ruined cliff-dwellings, the writer states that "corn stalks, husks, tassels, silk, cob and kernel are frequently found. That some of this material is as old as the buildings is proved by the fact that the stalks were used in the construction of the floors, being actually imbedded in the adobe; cobs

being also used to chink the walls with, an impression of the cob in the now hard adobe being found on detaching one from its bed. Corn husks on the cob, knotted or braided and bunched much as the Eastern farmer treats his seed-corn, are not uncommon. As already mentioned, the husks were used in in-soling for sandals and for the padding of other articles." - p. 135.

31. Black, Glen A. Prehistoric American diet. Ind. Mag. Hist. 29(2): 96-103. June 1933. Libr. Cong. F521.I52

See pp. 97-99 for the place of corn in the civilization of prehistoric America and of the white man. "Of all agricultural items of the prehistoric American, corn ranks foremost in importance. Cultural development among the Indians was dependent upon it and even the colonization of the United States by the whites owes its success largely to the Indian and his corn."

32. Blackburn, Glen A. The white man took more than the land; he acquired crops and tillage methods from America's first farmer, the Indian. Wallaces' Farmer 54(31): 1069. Aug. 2, 1929. 6 W15

"The variety of crops raised by the Indians is truly imposing, and our debt to the first American farmers is apparent when we consider that at least one-third of our crops of the present day were universally cultivated by the Indians...

"Corn is perhaps the best known crop produced by the Indian. It is not very flattering to the white man's industry, but it is nevertheless true that in nearly every respect, such as number of ears to the stalk, number of rows to the ear, and number of grains to the row, the product of Indian agriculture compares favorably with the average corn grown in the United States today...

"The method of cultivating the staple, maize, was largely taken over by the American colonists." - p. 1069.

33. Blakeslee, A. F. Corn and education. Jour. Heredity 8(2): 51-57. Feb. 1917. 442.8 Am3

The corn plant has been found to be very useful in studying heredity. The writer draws an analogy between the non-inheritance of education in man, and of certain acquired characteristics in corn.

"We hold that in corn or in men the potentialities of the individual are foreordained at birth; that these potentialities are alone inherited." - p. 57.

34. Blom, Frans Ferdinand. The conquest of Yucatán. 237pp., illus. Boston, New York, Houghton Mifflin co., 1936. Libr. Cong. F1376.B57

Bibliography, pp. 213-220.

There are a number of brief references to maize, its cultivation and storage, and its use as a staple food. (Consult the index)

35. Boardman, Samuel L. Indian corn. I. Historical and introductory. Maine State Bd. Agr. Rpt. (1877)22: 1-21. Augusta, 1877. 2 M28R 1877

This is the introductory essay among four papers which are followed by discussions on Indian corn. After a lengthy consideration of the

history and origin of the plant and a review of varieties, adaptability to climate and soil, etc., the writer states in conclusion: "I should like to give you a picture of the value and importance of this grand crop, this princely grain, this king of the cereals: of its surpassing beauty in its early growth, waving in the clear air of a July morning, or rich with its heavy fruitage when ripe for the sickle, in the bland, mild days of early autumn; of its vast use as food by a larger number of the human family than consumes any other single grain, except rice; of its importance in the economy of the food-supply of the nations, which renders it next to wheat, a better standard of value than gold itself; of the hope it gives to the heart of the farmer as he looks at a crib full of its golden life-giving ears." - p. 21.

36. Bogart, Ernest Ludlow. The economic history of the United States. Ed. 3, new impression, 597pp. New York, Chicago, etc., Longmans, Green and co., 1918. 277.12 B63E

"Third edition, with revision, June, 1915."

1938 edition in Library of Congress.

Selected references at end of chapters.

Bibliography, pp. 541-573.

The following on the importance of Indian corn is quoted from p. 42: "To the early settlers the indigenous plants which they found in the new world were of far greater importance than those which they brought with them. Of these, by far the most important at the time and in the subsequent history of the country was maize or Indian corn...Without this grain the early settlements would have been much more difficult of establishment. Maize, indeed, formed the main food crop of the colonists throughout their entire history." This paragraph is also in the writer's "Economic History of American Agriculture", p. 23. New York, Chicago, Longmans, Green & co., 1923.

The economic dependence of the colonial trade with the West Indies, particularly in the exports of wheat, corn and flour, is brought out on p. 116. With the proceeds of these exports goods were purchased from England. "As these colonies had little to export directly to England, without this trade they could not have paid for their imports from that country."

Two paragraphs, entitled "The Harvest from Neutrality", (pp. 121-122) tell of the great expansion in foreign trade during the period of 1791 to 1801 and the steady demand for agricultural products by the belligerent countries. Prices of wheat, corn and meat were very high and profits were enormous.

In a section on cereal production, pp. 334-336, the following is quoted from pp. 335-336: "Of the separate crops, corn is by far the most important, representing 80 per cent. of the total world production, and 60 per cent. of all the cereals in the United States in 1910; the crop for that year was worth $1,438,000,000."

37. Bogart, Ernest Ludlow, and Thompson, Charles Manfred. Readings in the economic history of the United States. New impression. 862pp. New York, Chicago, etc., Longmans, Green and co., 1921. 277.12 B63R

Copyrighted in 1916.

The place of corn in the foreign commerce of the United States in

1820-1860 is given in an extract from Eighty Years' Progress by Charles L. Flint (Hartford, 1869). - pp. 442-445.

38. Bolles, Albert Sidney. Industrial history of the United States, from the earliest settlements to the present time: being a complete survey of American industries...together with a description of Canadian industries. 936pp. Norwich, Conn., The Henry Bill publishing co., 1878. Libr. Cong. HC103.B69

Ch. V, pp. 73-79, is devoted to corn-origin, earliest cultivation in America, mode of culture, effect of Revolutionary War upon corn culture, increase since then, export, consequences of corn raising upon other industries, etc.

"So completely dependent, too, on the grain-transportation business, are many of the Western railroads, that their stocks rise and fall on Wall Street with every fluctuation of the crops, and the demands therefor. Indeed, to corn, more than to any other one agricultural product of this country, do we owe the expansion of our agricultural prosperity." Ib.p. 79.

39. Bollman, Lewis. Indian corn. U. S. Patent Off. Rpt. Agr. 1861: 262-288. Washington, 1862. 1 Ag84 1861

The writer's opening paragraphs follow: "When Linnaeus gave to Indian corn the botanical name of Zea mays, from the Greek word zao, to live, he chose the most appropriate that could have been given to it, for of all plants adapted to the support of animal life it is the first.

"As a food for the human race, its nutritious qualities compared with those of wheat are as 77 is to 95, whilst its general average price is but one-half only. No preparation of which wheat is susceptible can equal the cheap and nutritious breads from corn. What the potato is to Ireland Indian corn is to the world. To the poor and the rich, the sick and the well, whether in starvation or in abundance, it is more truly 'the staff of life' than wheat.

"This cheapness and its superiority in oils adapt it to the fattening of stock; and without it what could the American farmer do by relying on root crops, so uncertain in our irregular climate, and so costly where low-priced labor does not exist? Without it, what would become of that vast internal trade based upon cattle and hogs? In what other way could the employments and transportation connected with commerce be sustained?

"But the superiority of Indian corn does not consist alone in its cheapness and nutritive qualities, for in its adaptation to climatic extremes it is not less superior. It occupies a wider range of latitude and elevation than any other cereal...It was consecrated to their deities in the public worship of the aboriginal nations of this continent, and is a fitting theme for the inspiration of our best poets. The Christian who daily acknowledges his dependence on the Benificent Creator of all things finds in no plant so strong evidence of his good will. Accurately, then, did Linnaeus name it, for by it we live. Its inherent properties foreshadowed to him its vast production and its unequalled uses and benefits."

40. Bonafous, Matthieu. Histoire naturelle, agricole et économique du maïs. 176pp. Paris, Huzard; Turin, Bocca, 1836. Folio$^2$ 59 B64
The first chapter deals with the various theories concerning the origin of maize. In Chapters VI and VII the author discusses the uses of maize and its relation to rural and domestic economy, industry, hygiene and medicine.

41. Bonafous, Matthieu. Traité du maïs, ou histoire naturelle et agricole de cette céréale. Académie d'Agriculture de France. Mémoires d'Agriculture, d'Économie Rurale et Domestique, publiés par la Société, Royale et Centrale d'Agriculture, Année 1933, pp. 153-334. Paris, 1834. 14 P215M
Contains 7 chapters, the first of which discusses the author's conclusions as to the origin of maize, the sixth the use of maize in rural and domestic economy and industry, and the seventh the relation of maize to hygiene and medicine.

42. Bonnycastle, Sir Richard Henry. Spanish America; or a descriptive, historical, and geographical account of the dominions of Spain in the Western hemisphere, continental and insular. 482pp., illus. Philadelphia, A. Small, 1819. Libr. Cong. F1409.B71
List of works...relating to Spanish America, pp. 441-443.
Notes the importance of maize, its size and yield and its use for food and drink in Mexico. - p. 45.

43. Bradford, William. History of Plymouth plantation...now first printed from the original manuscript, for the Massachusetts historical society. Pub. at the charge of the Appleton fund. 476pp. Boston, Little, Brown and company, 1856.
The U. S. Dept. of Agriculture Library has only a photostat (negative) copy of pages relating to maize: pp. 82-83, 100-103, 129-130, 134, 167, 204, 208, 302, 366. (59.22 B72)
Governor Bradford tells of the discovery (and theft) of caches of maize hidden by the Indians, also of obtaining seeds for planting, without which the colonists would surely have starved. Squanto taught them how to plant and cultivate the corn, and how to fertilize the ground by placing a fish in the earth with each hill of corn. In their winter of scarcity, the colonists even became servants to the Indians in return for a cap-full of maize and were forced to get food by any means, even by stealing corn from the Indians.
After a successful harvest, the planters came to value their maize highly, since it had saved them from famine the previous year. They considered corn "more pretious than silver", and used it instead of money and for barter. The next year the Governor wrote of their "peace and health and contented minds, and so to blese ther labours, as they had corne sufficient (and some to spare to others)." - p. 204.
Corn was also used as barter in fur trading - once they exchanged a "boats load of corne" for 700 beaver and some other furs.

44. Brasseur de Bourbourg, [Charles Étienne]. Histoire des nations civilisées du Mexique et de l'Amérique Centrale durant les siècles antérieurs à Christophe Colomb, écrite sur des documents originaux et entièrement inédits, puisés aux anciennes archives des indigènes. 4v. Paris, A. Bertrand, 1857-59. Libr. Cong. F1219.B82

In Book I, ch. IV, there is an account of a tradition of the finding of maize by an envoy of the Nahoas as cultivated by a native population.

45. [Brenckman, Fred.] The history of king corn and his rise in America. Natl. Grange Monthly 36(11): 1, 33. Nov. 1939. 6 N215

The ascending importance of corn to the people of the United States, as a food and as a cereal crop, from Colonial times to the present is sketched in this article. The multiplicity of uses for corn give assurance of its continued extensive cultivation in the future in the Corn Belt.

"Valuable as a sustainer of life among primitive people in peace and in war, corn, ever since the days of the Jamestown and Plymouth colonists, has bulked large in the white man's existence on this continent. There is not indication that it will ever be otherwise... It is corn that enables these middle western states to produce such a surplus of pork and beef. The good homes, high land values and prosperity of the Corn Belt are a direct outcome of the wealth that the corn crop brings to this region. The corn crop of the Middle West is the land's greatest bulwark against famine." - p. 33.

46. Brewer, William H. Report on the cereal production of the United States. In U. S. Dept. of the interior. Census office. Report on the productions of agriculture as returned at the tenth census (June 1, 1880), embracing general statistics and monographs on cereal production... meat production, pp. 371-553. Washington, Govt. print. off., 1883. 157.4 C10 v. 3, 1880

Indian corn, pp. 90-110. The history of Indian corn is given on pp. 93-96. "Indian corn was the reliance of the early settlers, the European grains often failing them from their lack of experience with the sorts and climate of the country. In all, or nearly all of the colonies, from Massachusetts to the Carolinas, there were frequent laws passed regarding traffic with the Indians in corn. Embargoes were sometimes laid on its being carried out of the country, and in some of the colonies taxes might be paid in corn. In Connecticut there were several enactments fixing the price per bushel of this cereal in paying taxes." - p. 475.

"...from the first it [maize] became the most important cereal everywhere along the coast, and, all in all, it has probably remained so. Numerous travelers, even after the Revolutionary War, speak of it as an absolute necessity in the growing of live-stock in this country, and to the present day it has continued to be our most important cereal." - p. 476.

Exports and uses of Indian corn as manufactures and as fuel are discussed on pp. 485-487.

47. Brigham, William Tufts. Guatemala, the land of the Quetzal. A sketch. 453pp., illus. New York, C. Scribner's sons, 1887. Libr.Cong. F1464.B85
A list of works relating to Central America, pp. 430-442.
"Indian corn (maiz) is planted in slight holes made with a stick and covered with the foot, and seed planted on Thursday has been found four inches high on the following Monday. The stalks are sometimes seventeen feet high, and average three ears each; only ninety days are required to mature the crop, which is gathered three times each year." - p. 39.
"Indian corn (Zea Mays) grows well all over the republic, and forms the most important food of the Indian tribes...The corn is always stored and transported in the husk. When the Spaniards first came among the Central Americans, they found the milpas of maiz carefully cultivated; and as to-day the little cornfields are found all over the country cultivated precisely as the ancients were doing centuries ago, so the product is to-day prepared and eaten in the same old-time manner." - p. 363.

48. Brinton, Daniel Garrison. The myths of the new world; a treatise on the symbolism and mythology of the red race of America. Ed. 3, rev., 360pp. Philadelphia, David McKay, 1896. Libr. Cong. E59.R38B85
The following statements appear on page 35:
"By substituting a sedentary for a wandering life, by supplying a fixed dependence for an uncertain contingency, and by admonishing man that in preservation, not in destruction, lies his most remunerative sphere of activity, we can hardly estimate too highly the wide distribution of the Zea Mays. This was the only general cereal, and it was found in cultivation from the southern extremity of Chili to the fiftieth parallel of north latitude, beyond which limits the low temperature renders it an uncertain crop. In their legends it is represented as the gift of the Great Spirit (Chipeways) brought from the terrestrial Paradise by the sacred animals (Quiches), and symbolically the mother of the race (Nahuas), and the material from which was moulded the first of men."

49. Brinton, Daniel Garrison. Notes on the Floridian Peninsula, its literary history, Indian tribes and antiquities. 202pp. Philadelphia, Published by Joseph Sabin, 1859. Libr. Cong. F314.B85
The following is quoted from p. 123 of a chapter on the civilization of the tribes of the sixteenth century: "Their agriculture was of that simple kind common to most North American tribes. They planted twice in the year, in June or July and March, crops of maize, beans, and other vegetables, working the ground with such indifferent instruments as sticks pointed, or with fish bones and clam-shells adjusted to them. Yet such abundant return rewarded this slight toil that, says De Soto, the largest army could be supported without exhausting the resources of the land. In accordance with their monarchial government the harvests were deposited in public granaries, whence it was dispensed by the chief to every family proportionately to the number of its members." When the stock was exhausted before the next crop was ripe they lived on game and fish.

50. Brinton, Daniel Garrison. A primer of Mayan hieroglyphics. 152pp. Boston, Ginn & co. [1895] (Pennsylvania. University. Publications. Series in philology, literature and archaeology, v. 3, no. 2). Libr. Cong. PM3962.B7

On p. 62 there is a description of the maize god, "associated with symbols of food, of vegetable growth, and of prosperity...Bishop Nuñez de la Vega tells us that in the calendar he discovered among the natives of his diocese, the fourth 'sign' or day corresponded to the Mexican Centeoth, god of fertility and the maize harvests."

51. Brooks, Eugene Clyde. The story of corn and the westward migration. 308pp. Chicago, New York [etc.] Rand, McNally & co. [1916] 59 B79

Bibliography, pp. 302-303.

"The story of Corn is a story of the struggle of the human race for food. Primitive people deified the natural forces that produced the food. When man relied on only one cereal, famines were frequent. But the discovery of America gave to the world a new cereal, maize or Indian corn, and since that time famines among civilized people have grown less and less frequent, until to-day they are practically unknown in civilized countries. This new cereal, Indian corn, sustained the first settlers in their attempts to build homes in the New World, and as the settlers moved westward, it was Indian corn that drew them to the new lands and supported them while they opened the great states beyond the mountains. The upper Mississippi Valley, then, became the world's granary, and Chicago the greatest food market in the world.

"The grain of the West stimulated the demand for better communication, and internal improvements became a great national issue. Highways, canals, steamboats, and railroads were built to connect the East and the West in order that the grain and grain products might reach the markets of the East. In this way the corn of America affected the politics of the United States." - Preface, pp. v-vi.

This is an elementary economic history of the cereals with special emphasis on Indian corn, and is perhaps intended as a text book for grade or high school students. The writer's purpose was to bring out geographical and historical factors in agricultural development and to show the "tremendous importance of agriculture in the history of the race."

The chapters on corn and the corn country of the United States are of special interest to this bibliography, as is chapter 3 entitled "Food a Factor in Civilization" from which the following statements are quoted:

"This corn of the Indians, however, was the one grain that was to make America prosperous and end the great famines of the world. It was this grain that saved the first colonies along the coast, and supported the pioneers as they pressed westward; and the grain that fed the Indians from the river valleys along the coast to the lands beyond the Mississippi...It was maize, this Indian corn, that gave strength to the settlers in their conquest of the New World; and after this great valley was opened it was maize, this same Indian corn, at first despised by the Europeans, that made the Mississippi Valley the food center of America and the granary of the world." - p. 42.

"And if this one grain that Columbus found on the island of Haiti were suddenly taken from the world, famine and pestilence would again stalk abroad in the land and the progress of the world would come suddenly to a standstill." - p. 43.

The writer proceeds to show the important place of corn in the development of American history.

"It was the great corn country, however, that made agriculture a science. Here improved machinery was first used and the first agricultural college was established (1857)." - p. 242.

"In South America it is an important crop of the Argentine and parts of Chile, and is cultivated in nearly every South American country. It is the leading crop of Mexico and Central America, and the natives of the West Indies have depended almost entirely upon it since long before the days of Columbus." - p. 275.

"When Columbus saw those patches of Indian corn growing on the Island of Haiti, he could not of course foresee that within four centuries this new grain would become the basis of the wealth and prosperity of America, and necessary to the protection of the world against famine and pestilence...When Columbus's three frail vessels first sighted this new world, wheat was the leading food, famine and pestilence made periodical visits and claimed a large percent of the inhabitants of the world. But four hundred years later...Indian corn had made the new continent richer than the fabled cities of mythology, and had driven famine from the civilized world." - p. 300.

52. Brown, Charles E. Wisconsin garden beds. Wis. Archeol. 8(3): 97-105. Aug.-Oct. 1909. Libr. Cong. E78.W8W8

Account of garden beds and Indian corn hills found in Wisconsin.

53. Brown, Frederick Martin. America's yesterday. 319pp. Philadelphia, J. B. Lippincott co., 1937. Libr. Cong. E58.B875

There are scattered references to corn and its culture among the aborigines of North and South America. In writing about the cultures of Middle America, the author says:

"These archaic peoples, like all of the peoples of America, were agriculturalists and it is probably due to their strivings that the great maize cultures developed on the American continents." - p. 80.

In the chapter, America's Contribution, the writer points to maize as an American food product and says: "Just as the Asiatic peoples might be said to represent a rice civilization, the American Indians had a maize civilization. Wherever they tilled the soil efficiently, their staple agricultural product was maize." - p. 272.

54. Brown, Ignatius. Indian corn. Ind. State Bd. Agr. Rpt. 1856(5): 331-355. Indianapolis, 1858. 2 In2R 1856

An essay read before the State Board of Agriculture.

The opening pages of the essay are concerned with the origin and nativity of the maize plant, its place in traditions and legends, as well as its practical utilization. The rest of the discussion relates to corn culture, varieties, diseases, etc.

"When Columbus first landed on the Western Continent he found its inhabitants engaged in the cultivation of a plant whose striking virtues had become the theme of legendary history." - p. 331.

"Nearly all of the more recent writers maintain its American origin, and their opinion is sustained by the united testimony of the early explorers, and the almost conclusive fact that in America alone has it been found growing wild...There can be no doubt that long prior to that event the Indians of both sections of the continent, cultivated several varieties of the plant, and prepared the grain for food by a number of methods, some of which are yet popular in certain parts of the country. The appone of the Virginia Indians is the corn pone of the backwoodsman. Mush, or mote, is an Indian dish, and parched corn formed the staple food of their war and hunting parties during long and tedious journeys. On the Islands and in South America a number of the tribes extracted an oil from the grain, and prepared an intoxicating liquor which their first visitors quaintly described as 'not unpleasant, yet nevertheless verie stronge.' An old author in speaking of the inhabitants of New Granada, says that maize formed an important part of their subsistence...That it was of two kinds: the finer afforded forage for animals, and bread for the people, who either boiled the grain in water, parched it in the ashes, or ground it into meal and made cakes of it; and that they fermented the grain and obtained a strong liquor from it. Another author, in treating of the West Indies, says: 'The Indians eat it hot, boiled, and call it "mote", and sometimes toasted. They also grind it and make cakes called arepas, which they eat hot. They extract oil from it, which serves instead of butter or olive oil.' The accomplished Garcillasso, the descendent of a long line of Incas, in speaking of the products and the people of his unfortunate country, says that the principal fruit was the Mexican mays, or peruvian cara, which was the only bread in use...The physicians prescribed a maize diet to their patients, and used it as a poultice to relieve pain. The people made a kind of honey of the unripe stalks, and a strong beverage, which they afterward converted into vinegar by a peculiar process. The excessive use of this intoxicating beverage, which was called vinnapu or sora, was prohibited under strong penalties by the Inca. Garcillasso further says that the palace gardens of the Incas, at Cusco, were ornamented with gold and silver images of beasts, birds, trees, flowers, and fruits...In the garden of gold and silver, an entire corn field - with the stalks, spikes, ears, and leaves of the plant of their natural shape and size - was represented...

"The origin of this plant forms the theme of many wild old legends among the tribes of North and South America...The ancient Peruvian traditions, extending through a period of four hundred years anterior to the Spanish conquest, fully prove that maize was their staple product, and that with them, as with the ruder northern tribes, it entered into many festal rites and ceremonies." - pp. 332-335.

55. Browne, Daniel Jay. Memoir on maize or Indian corn. In Barlow, Joel. Hasty-pudding; a poem, pp. 13-48. New York, C. M. Caxton [n.d.] 59 B81M

Also in Amer. Inst. City of New York, Ann. Rpt. (1846)5: 412-448. 1847. 500 Am38

The article contains information on the history and origin of corn, its use and cultivation by the Aborigines of North and South America, its place in the Mythology of the Incas of Peru and the chemical composition of maize. The writer also recommends (and gives his reasons therefor) that England could very profitably import and learn to consume a great deal of American corn.

56. Browne, Peter Arrell. Essay on Indian corn. Farmers' Cabinet 2(5-6, 8-10, 12): 75-77, 90-92, 123-125, 139-141, 150-152, 187-190. Oct. 2, 17, Nov. 15, Dec. 1, 15, 1837; Jan. 15, 1838. 6 F222

This paper was delivered before the Cabinet of Natural Science of Chester County, Pennsylvania.

The discussion is divided into several topics, among which are The Origin of maize; Is it a native of America?; Quantity raised in the United States; Varieties; Cultivation; and Uses.

The writer concludes that maize was native to this hemisphere, that it was extensively cultivated by the Indians when the first explorers and voyageurs came to America, and that maize forms an important article of food in both North and South America.

57. Bruce, Philip Alexander. Economic history of Virginia in the seventeenth century; an inquiry into the material condition of the people, based upon original and contemporaneous records. 2 v. New York and London, Macmillan and co., 1896. 277 B83

Pages 149-165 of v. 1 reprinted in Readings in the Economic History of American Agriculture (pp. 40-49), edited by Louis Bernard Schmidt and Earle Dudley Ross. New York, The Macmillan co., 1925.

The chapter on Aboriginal Virginia: Indian Economy, pp. 140-188, contains detailed descriptions of the Indian methods of planting, cultivation and harvesting corn. It formed the staple food supply, both as roasting ears and as corn meal cooked in various ways. The Indians stored away ripened corn for future use, and at certain seasons they relied on this stored corn for subsistence. They sometimes bartered it for other goods, and valued it so highly that a theft of maize was punished with death. In his later chapters on Agricultural Development, the writer points out that these same methods of corn planting and cultivation and harvesting formed the pattern adopted by the English settlers and that the corn probably saved them from famine during the first years of the colonial era.

"One of the earliest laws passed by the first Assembly that met in the Colony, the Assembly which Yeardley summoned in 1619, provided that every householder should reserve in store a barrel of Indian corn not only for himself, but also for every servant in his employment, but this grain was to be used only in case their necessities compelled it. The planter who had arrived in Virginia in the course of the previous twelve months was exempted from the scope of this law." - p. 236.

58. Buechel, Frederick Anthony. The commerce of agriculture; a survey of agricultural resources. 439pp. New York, J. Wiley & sons, inc. [etc.] 1926. (Wiley agricultural series) 278 B86

References at end of most of the chapters.

Ch. VI entitled, Cereals and Forage Crops, contains a section (pp. 163-172) on corn which discusses the place of corn in colonial life, present importance, physical and biological factors affecting corn production, areal production and distribution of corn, and economic factors. The following is quoted from pp. 163-165: "Unlike wheat, corn has, comparatively speaking, only recently played an important part in the economy of man. Indigenous to the highlands of tropical America, it was the earliest cultivated crop on the American farm. The Indians taught the first white settlers how to raise corn and how to prepare it for consumption...Corn soon became one of the mainstays of the early colonists and of the later pioneers in their conquest of a continent...As the westward migration gained momentum and the Appalachian mountain system was crossed, corn took on new economic importance. It came to be less and less important as a food for direct human consumption and became increasingly important as food for livestock...corn is perhaps the most important agricultural crop of the Western hemisphere. Almost unknown in many parts of the world, this grain surpasses all other crops of the United States in both value and acreage. In Mexico, Central America, and a large portion of South America, it is the mainstay of the human diet. Corn is not primarily a commercial crop, and it is of little significance in international trade; but in those countries which devote a large part of their agricultural energy to its production, it is tremendously important...In addition to the corn that is used as grain, a great deal of the crop is converted into fodder and silage, and for this reason it is closely related to the production of dairy products as well as to the beef and hog industry."

59. Bullock, Dillman Samuel. The agricultural situation in Peru. 143pp., typewritten. [Washington, D. C., 1923] 1.9 Ec7Ap

The following statements on corn are quoted from p. 27:

"Corn is probably not the most valuable but it certainly is the most important grain crop grown in Peru. Before the Spanish conquest, it was the only cereal grown by the Indians and was undoubtedly one of their principal food crops. At present it is grown in every part of the country and constitutes a larger proportion of the food of the working classes than any other single crop.

"It is grown under a great variety of conditions from sea level up to 12,000 feet in the mountains. Some regions have become famous for the particular varieties of corn which they produce. The greater part of the production is in the numerous mountain valleys where it is grown under irrigation. There are valleys where the crop has been grown continuously on the same soil every year for as long as the present inhabitants can remember. Many of these sections have probably grown corn almost continuously for more than 300 years.

"Very little corn is either imported or exported, so that practically the entire crop is for home consumption where it is used almost entirely for human food."

60. Burbank, Addison. Guatemala profile. 296pp., illus. New York, Coward-McCann, inc., 1939. Libr. Cong. F1464.B93

"...in a nutshell the history of the Mayas is this: Some prehistoric Luther Burbank discovered that the wild maiz could be cultivated and stored; men learned to look upon one another as brokers and to cultivate the fields for the common good; then they recognized special gifts in certain men and released them from labor to direct the building of beautiful cities and monuments." - p. 19.

The tilling of the milpa and the grinding of the corn and baking of the tortillas are described. - p. 72.

Before the arrival of the Spaniards "common people built their ranchos exactly as they do to-day. According to the climate, the walls were made of corn, cane, or bamboo stalks, or of wattle plastered with mud and whitewashed with lime...Each man had his milpa upon which to raise his quota of maíz. Mayan civilization rested upon a basis of maíz and lime." - p. 157.

61. Burlison, W. L. The red man's corn. Home Geogr. Monthly 2(2): 13-18. Aug. 1932. Libr. Cong. G1.H6

This article in popular style tells the story of corn and its cultivation and uses among the peoples of the earth. "Indian corn, or maize, is America's greatest food gift to the rest of the world...Before the white man came to America, the Indians were growing corn over most of North and South America. The Incas of the Andes Valleys, the Mayas of Central America, the Aztecs of Mexico, and nearly all the tribes of the United States were growing corn for part of their food." - p. 13.

"And before the Indians, the peoples who lived in North and South America, like the mound builders, the basket makers and the cliff dwellers - whoever they were and whatever they were like - grew corn for one of their principal foods." - p. 15.

The writer tells how the settlers and pioneers learned corn culture and corn cookery from the aborigines, and how the growing of corn has come to be a major wealth producing activity in the Corn Belt as in many other parts of the world.

62. Burtt-Davy, Joseph. Maize; its history, cultivation, handling, and uses, with special reference to South Africa. A text-book for farmers, students of agriculture, and teachers of nature study. 831pp. London, Longmans, Green and co., 1914. 59 B95

Although this text book has special reference to South Africa, it does contain material such as the chapter on Importance and History, in which the writer states, and substantiates it with authorities cited, that corn is a plant of American origin. He then tells of its introduction into Europe, Africa, and Asia. Except for this chapter, the book deals with corn culture, varieties, breeding, climatic requirements, botanical characteristics, soils, diseases, commerce, food uses, etc.

In Ch. XIV, Maize Grain as Food, pp. 673-731, the writer tells of the various uses of maize for food and drink by the Aztecs, Incas, and North American Indians, in addition to present day uses in Africa and other countries.

63. Bush, A. K. The evolution of corn growing and feeding in the Northwest. Amer. Seed Trade Assoc. Proc. 34(1916): 37-41. 61.9 Am3 1916
The writer contends that corn has replaced wheat and flax and led to a more diversified agriculture in this Northern section of the United States due to the cultivation of varieties that are adapted to colder climates. The corn is produced for four purposes, i.e., fodder, silage, pasture, and grain.

64. Bushnell, David I. Villages of the Algonquian, Siouan, and Caddoan tribes west of the Mississippi. Smithsn. Inst. Bur. Amer. Ethnol. Bul. 77, 211pp. Washington, D. C., 1922. 500 Sm63B
On p. 179 the author quotes a paragraph from Saxton's Journal, 1853, v. 1, p. 265, which refers to the Arikara villages at Fort Clark on the Missouri River, and brings out the idea that great surpluses of corn were produced by these Indians, and that it was bartered or exchanged with the Crows and Dacotahs for dried buffalo meat and robes.

65. Calvert, Mrs. Amelia Catherine (Smith), and Calvert, Philip Powell. A year of Costa Rican natural history. With maps and illustrations. 577pp. New York, The Macmillan co., 1917. Libr. Cong. QH108.C3
Contains scattered references to maize and its use as food. "Tortillas being a staple food, the grinding of the maize into meal is a daily occupation of the poorer Costa Rican women. The native instruments are the 'piedra' (stone), a large block of the common lava, the upper surface smoothed and slightly hollowed, and the 'mano de piedra,' a sort of stone rolling-pin without handles. The piedra may be much more elaborate and those exhumed from old Indian graves usually have four short legs and often have animals' heads carved on the ends, while the mano de piedra has a handle and looks in side view like a modern chopping knife. Some piedras of this more elaborate pattern are still in use, but in the ordinary kitchen the simpler style is the common one. It was interesting to see how this old native implement was being replaced by a modern imported machine of the coffee mill or meat-grinder type...and both the iron grinders and the piedras were sold in the market."

66. Candolle, Alphonse L. P. P. de. Géographie botanique raisonnée; ou, Exposition des faits principaux et des lois concernant la distribution géographique des plantes de l'époque actuelle. 2 v. Paris, V. Masson; [etc., etc.] 1855. Libr. Cong. QK101.C2
The author declares that maize is definitely indigenous to America in spite of the contrary opinion of Bonafous and others. But he is not willing to commit himself as to its exact place of origin although he thinks it was probably Mexico. The subject is discussed and many authorities quoted on pages 942-952.

67. Candolle, Alphonse L. P. P., de. Origin of cultivated plants. 468pp. New York, D. Appleton and co., 1914. (International scientific series) 463.6 D350
A section on pp. 387-397 is devoted to maize, which the writer maintains is of American origin.

"At the time of the discovery of the new continent, maize was one of the staples of its agriculture, from the LaPlata valley to the United States. It had names in all the languages. The natives planted it round their temporary dwellings where they did not form a fixed population. The burial-mounds of the natives of North America who preceded those of our day, the tombs of the Incas, the catacombs of Peru, contain ears or grains of maize, just as the monuments of ancient Egypt contain grains of barley and wheat and milletseed... Nothing is better calculated to show the antiquity and generality of the cultivation of a plant than this intimate connection with the religious rites of the ancient inhabitants." - p. 393.

68. Carnegie institution of Washington. Office of publications. Maize and the Maya. Carnegie Inst. Wash. News Serv. Bul. Press Ed., v. 4, no. 26, 6pp. Washington, D. C., May 8, 1938. Pam. Coll. 59.22C

The writer describes the agriculture of the Mayas, and their milpa system, the distinguishing characteristic of which was the abandonment of a clearing after crops were grown on it for two or three seasons and a new clearing made in the forest to take its place. The maize cake (tortilla) was the mainstay of the diet, and the daily activities of the people centered around the growing and harvesting of corn.

"As maize occupies a dominant place in the dietary of the present-day Maya, so also, it was the staff-of-life to their temple-building ancestors. Indeed, there is every reason for believing that it was the development of the corn plant and the mastery of its culture that made possible the rise of the aboriginal cultures of the New World." - p2.

69. Carr, Lucien. The food of certain American Indians and their methods of preparing it. Amer. Antiquarian Soc. Proc. (1895)10(1): 155-190. 1895. Libr. Cong. E172.A35

Bibliographical foot notes.

"Of these corn was by far the most important; and as it seems to have been the main dependence of all the tribes that lived south of the St. Lawrence and east of the tier of States that lines the west bank of the Mississippi, and as the manner of cultivating it and the different ways of cooking it were practically the same everywhere and at all times..." - p. 159. There is a good description of the methods of cultivation, husking, harvesting and preparing the corn for food, including utensils and household furniture involved.

70. Carr, Lucien. The mounds of the Mississippi Valley, historically considered. Smithsn. Inst. Ann. Rpt. 1890/91: 503-599. 1893. 500 Sm6R 1890/91

A section, pp. 507-533, entitled "I. - The Indian As An Agriculturist" is devoted to substantiating with numerous quotations and foot notes the thesis that the Indians led a sedentary agricultural life as did the mound builders and the chief agricultural products and the mainstay of the diet of all the tribes living east of the Mississippi and south of the St. Lawrence and the Great Lakes was maize.

71. Carrier, Lyman. The beginnings of agriculture in America. Ed. 1, 323pp. New York, London, McGraw-Hill book co., inc., 1923. 30.9 C23
Bibliography, pp. 308-312.
See p. 131 for a paragraph on the importance of maize to Virginia and to all Colonial America. Maize saved the Virginia colony from starvation, was "an export commodity, when tobacco prices fell below the cost of production," and enabled the farmers to raise livestock on a large scale. The agriculture of all colonies was built around maize. "It is difficult to see how any of the early settlements could have maintained their existence without maize. This crop has done more to promote the wealth and prosperity of this country than all the other natural resources power, minerals, forests, etc., put together."

72. Carver, Jonathan. Three years travels through the interior parts of North America for more than five thousand miles; containing an account of the great lakes...soil and vegetable productions of the northwest regions of that vast continent...and an appendix describing the uncultivated parts of America that are the most proper for forming settlements. 360, 20pp. Philadelphia, Published by Key & Simpson, 1796. Libr. Cong. F597.C38 - Office
A description of Indian corn is given on pp. 346-347. It is said to be wholesome and easy of digestion. Eaten in cakes before it is ripe, it is "very agreeable to the palate, and extremely nutritive."

73. Carver, T. N. Historical sketch of American agriculture. In Cyclopedia of American agriculture, ed. by L. H. Bailey, ed. 4, v. 4, pp. 39-70. New York, London, The Macmillan co., 1912. 30.1 B15C v. 4
The following extracts have been taken from the article:
"Few of us today understand how much American agriculture owes to the Indian. We are disposed to dwell on the rudeness of his methods rather than on the service that he rendered...
"Indian corn, or corn, as it is universally called in the United States, deserves, for several reasons, to be called the typical American product...There is, therefore, no other product which deserves, on so many counts, to stand as the American product." - pp. 39-40. Indian methods of cultivating and storing corn and the teaching of these methods by two Indian prisoners to Captain John Smith's men are described on p. 40.
"Melons, squashes, potatoes, and various fruits were grown in considerable abundance; but corn was the chief reliance as a food product. During the early years of the colony, and as late as 1655, if not later, every householder was required to cultivate a certain amount, usually two acres, of corn. This was to prevent them from giving all their time to tobacco and leaving the colony dependent on outside sources for its food. Corn soon became so abundant, however, as to need an outside market. In 1631 and afterward, agents were sent to New England, Nova Scotia, the West Indies, and the Dutch settlements, to offer them corn at twenty-five shillings a barrel, delivered." - p. 43.

74. Case, Earl Clark, and Bergsmark, Daniel R. Modern world geography, economic and social. 746pp. Chicago [etc.] J. B. Lippincott [1938.] 278 C26

Further readings at ends of chapters.

"Corn and the Corn Belt" is the title of ch. 8 which contains a discussion of corn and civilization, the geography, climate, soil, and productivity of the corn belt in the United States, mechanization of crop production, and the relation of corn to the livestock and dairy industries.

"Corn is, and always has been, America's most valuable crop. It had been grown by the Indians for centuries before Columbus discovered America. It was the most valuable crop of the early colonists; it held first place among the crops of the frontiersmen as they marched westward across the humid portions of the United States; and it is the most important crop of America today." - p. 129.

75. Cassidy, Louise Lowber. America's aboriginal corn belt. Wallaces' Farmer 51(46): 1471, 1481. Nov. 12, 1926. 6 W15

A description of Pueblo methods of corn culture and ceremonials and prayers connected with corn is given. "Centuries before the birth of Christ, ancestors of the Pueblo Indians of New Mexico and Arizona progressed from savagery to a relatively high state of culture. This early civilization was founded on the cultivation of corn, which the Indians considered a gift from the gods." - p. 1471.

76. Castetter, Edward F., and Underhill, Ruth M. Ethnobiological studies in the American Southwest. II. The ethnobiology of the Papago Indians. N. Mex. Univ. Bul. 275 (Biol. Ser. v. 4, no. 3) 84pp. Albuquerque, 1935. 500 N462 no. 2

Bibliography, pp. 79-80.

In a section on The Growing and Utilization of Cultivated Plants, pp. 29-39, is found a description of the simple agriculture of the Papagos, who did not practice irrigation, but planted their seeds at the mouth of a wash after the summer rains, and many times lost their crops due to insufficient water supply. The varieties of maize mentioned in their planting songs, and their methods of preserving and cooking it are told on pp. 34-35.

77. Castetter, Edward F., and Opler, M. E. Ethnobiological studies in the American southwest. III. The ethnobiology of the Chiricahua and Mescalero Apache. A. The use of plants for foods, beverages and narcotics. N. Mex. Univ. Bul. 297 (Biol. Ser. v. 4, no. 5) 63pp. Albuquerque, 1936. 500 N462 no. 3

Bibliography, pp. 57-58.

In a section on Agriculture, pp. 27-29, the writer states that the Apaches were nomadic tribes and spent very little time on maize growing. "They obtained maize from the Pueblos and the Mexicans, planted some in sheltered canyons, returned once or twice to pull the worst of the weeds, even did a little irrigating if the land were exceptionally dry and water could be easily diverted to it, and then came back when they thought the crop would be ready to harvest." - p. 27.

The corn was used for bread making, and was preserved by roasting or drying.

78. Centro industrial do Brasil. Brazil: its natural riches and industries. (Foreign edition). Volume II...[parts 2-4] 418pp. Paris, Aillaud, Alves & cie, Rio de Janeiro, Francisco Alves & cia [1910] 255.3 C33B v.2

At head of title: Commissão d'expansão economica do Brazil.

In a section on Cereals and Vegetables, pp. 131-141, there are three pages of discussion on maize growing in Brazil. The writer states that maize "forms one of the most extensive forms of cultures in Brazil, where it is used as plant for food, fodder and industrial uses." - p. 138.

"Maize prospers in all the States of Brazil up to an altitude of 900 metres and sometimes higher." - p. 139.

Maize culture in Brazil is generally still carried out according to primitive methods, the land for planting being obtained by destroying new sections of forest land, which are abandoned when their fertility is depleted. However, newer agricultural practices of soil conservation and fertilization are gradually being introduced. The milpa system, in addition to the cost and labor of clearing new land, meant moving the maize fields farther and farther from markets, thus increasing the expense of transportation.

79. Chamberlain, Alexander F. The contributions of the American Indian to civilization. Amer. Antiquarian Soc. Proc. (n.s.)16(1903): 91-126. 1905. Libr. Cong. E172.A35

"Maize is, perhaps, the gift of the American Indians to mankind, a gift to be ranked with the greatest benefactions of any of the races of the globe...how shall we word the praise of that primitive American people who first changed a wild grass into the all-bountiful maize?" - p. 117.

The early settlers learned from the Indians the art of making mats, etc., out of corn husks, "and perhaps the corn-cob pipe has a similar origin." - p. 117. The writer tells some of the many uses for corn and the corn plant to show its value in American life.

80. Champlain, Samuel de. Voyages of Samuel de Champlain. Translated from the French by Charles P. Otis, with memoir by Edmund F. Slofter. 3v. Boston, 1878-1882. (Prince Society Publications. vols. XI, XII, and XIII) Libr. Cong. F1030.1.C493

All three volumes contain scattered references to the growing of Indian corn in various localities and to its use as food.

81. Charlevoix, Pierre François Xavier de. Journal of a voyage to North America. Translated from the French...Edited, with historical introduction, notes and index, by Louise Phelps Kellogg. 2v. Chicago, The Caxton club. 1923. Libr. Cong. F1030.C505

A reprint of the first London edition of 1761.

Charlevoix's voyage was undertaken by order of the French king and his journal contains "the geographical description and natural history of that country, particularly Canada, together with an account of the customs, characters, religion, manners and traditions of the original inhabitants."

The cultivation of corn and its use as food by the Indians are described on pp. 111-115.

82. Chase, Stuart. Mexico; a study of two Americas, by Stuart Chase in collaboration with Marian Tyler; illustrated by Diego Rivera. 338pp. New York, The Macmillan co., 1931. Libr. Cong. F1215.C493

Ch. III, pp. 37-57, is entitled Maize Civilization. "On the slender economic foundation of maize and the cactus plant, the early Mexicans and their neighbours reared the extraordinary superstructure of their engineering, their astronomy, their religions and their architecture. No other race that I can call to mind allowed so wide a disparity between the simple bread with which they fed their bodies and the arts by which they nourished their souls...

"The maize culture on which this civilization grew included not only the tribes of Mexico, Guatemala and Yucatan, but the Cocles in Panama, the Manabis and Chitchas of Ecuador and Colombia, the pre-Incas and Incas of Peru. The span of time comprehended was close to 5,000 years. All these peoples had certain common traits. They were primarily agricultural, growing, besides maize, beans, squashes, melons, nuts, cacao and many fruits."

A classified list of the achievements of the Mexican branch is given. The list includes engineering, architecture, astronomy and science, language and literature, health and hygiene, handicrafts, social institutions, and the organization of government.

The milpa and the use of maize for food are described on pp. 131-132. "It is impossible to conceive Mexico without maize...Substituting an even more nourishing staple would do no good, for it is the tradition and the habits of the maize which make Mexico what it is. Nor should we of the North forget how Indian corn kept the first New Englanders alive."

83. Cieza de León, Pedro de. The second part of the Chronicle of Peru. Tr. and ed., with notes and introduction, by Clements R. Markham. 247pp. London, Printed for the Hakluyt society, 1883. (Works issued by the Hakluyt society. No. LXVIII) Libr. Cong. G161.H2

The first part of the Chronicle forms no. 33 of the works of the Hakluyt society.

Contains scattered references to chicha, a fermented liquor made from maize and a note on the golden maize at the temple of the sun.

84. Cieza de León, Pedro de. The travels of Pedro de Cieza de Leon, A. D. 1532-50, contained in the first part of his Chronicle of Peru. Tr. and ed., with notes and an introduction, by Clements R. Markham. 438pp. London, Printed for the Hakluyt society, 1864. (Works issued by the Hakluyt society [no. XXXIII]) Libr. Cong. G161.H2

The second part of the Chronicle forms no. 68 of the works of the Hakluyt society.

Contains scattered references to maize.

85. Clark, S. P. Lessons from southwestern Indian agriculture. Ariz. Agr. Expt. Sta. Bul. 125, pp. 233-252. Tucson, 1928.

"This bulletin was written to make available some of the agricultural practices of the [Hopi, Navajo, and Papago] Indians of the Southwest, that have enabled them to live through long periods under extremely adverse conditions." - p. 233.

"The Hopis are, from the nature of their environment and economic conditions, practically vegetarians...Corn is the mainstay of the Hopi housewife's menu and she has many methods of preparing it. The Hopis appreciate the value of green food and its substitutes in their diet." - p. 234.

"The Hopi Indian has found through long experience that dry years come, and that it is always well to provide for them; so the thrifty housewife stores enough corn to tide the family through at least one crop failure." - p. 238.

86. Clavijero, Francisco Javier. The history of Mexico, collected from Spanish and Mexican historians, from manuscripts, and ancient paintings of the Indians...with critical dissertations on the land, animals, and inhabitants of Mexico. By Abbé D. Francesco Saverio Clavigero. Translated from the original Italian, by Charles Cullen. 3v. Philadelphia. Published by Thomas Dobson at the Stone House, No. 41 South Second Street, 1817. Libr. Cong. F1219.C623

"Of grain, the chief, the most useful, and most common was the maize, called by the Mexicans, Tluolli; of which there are several species, differing in size, colour, weight, and taste...Maize was carried from America to Spain, and from Spain into the other countries of Europe, to the great advantage of the poor, though an author of the present day would make America indebted to Europe for it; an opinion the most extravagent and improbable which ever entered a human brain." - v. 1, book 1, p. 35.

The method of sowing maize is described. "In the labours of the field the men were assisted by the women. It was the business of the men to dig and hoe the ground, to sow, to heap the earth about the plants, and to reap; to the women it belonged to strip off the leaves from the ears, and to clear the grain; to weed and to shell it was the employment of both.

"They had places like farm yards, where they stripped off the leaves from the ears, and shelled them, and granaries to preserve the grain. Their granaries were built in a square form, and generally of wood." Their construction and capacity are described, and they are said to "preserve the grain better than those which are constructed by the Europeans.

"Close to fields which were sown they commonly erected a little tower of wood, branches and mats, in which a man defended from the sun and rain kept watch, and drove away the birds which came in flocks to consume the young grain." - v. 2, book 7, pp. 178-180.

87. Cobo, Bernabé. Historia del nuevo mundo. Publicada por primera vez con notas y otras ilustraciones de D. Marcos Jiménez de la Espada. 4v. Sevilla, Imp. de E. Rasco, 1890-95. (Sociedad de Bibliófilos Andaluces [Obras Publicadas. 1.ser.]) Libr. Cong. F1411.C65

"Escrita en el año 1653." - Advertencia Preliminar.

Book IV, ch. III, contains an account of the wide-spread cultivation of maize in the New World, its adaptability to all kinds of climate and altitudes, its appearance and its use for food and as a medicine. Ch. IV, entitled De la Chicha de Maiz, deals with the drinks made from maize by the Indians and the Spaniards.

88. Collins, Guy N. Notes on the agricultural history of maize. Amer. Hist. Assoc. Ann. Rpt. 1919, v. 1, pp. 409-429. Washington, D. C., 1923. 134.9 Am3 1919

Reprinted in Agricultural History Society Papers, v. 2, pp. 409-429. 1923.

In this paper, the author traces the history of the maize plant from earliest times to the present. He also tells something of the importance of maize in American civilization, such as:

"With both the Jamestown and the Plymouth colonies, starvation was averted by virtue of maize, and in both settlements the colonists learned from the natives how to grow this new food plant." - p. 421.

"The early colonists came well supplied with seeds of European crops, yet at both Jamestown and Plymouth they were able to become self-supporting only by promptly adopting maize and following the Indian method of cultivation, a method of cultivation radically different from anything known to the colonists." - p. 422.

"It is a commonplace remark that maize is the gift of the Indian. But the extent to which the details of agricultural practices have been copied from the Indian has never been fully appreciated." - p. 424.

89. Collins, Guy N. Pueblo Indian maize breeding. Jour. Heredity 5(6): 255-268. June 1914. 442.8 Am3

"Among the many gifts that the white man received from the American Indian, maize is undoubtedly the most valuable." After this introduction, the writer discusses the maize growing methods of the southwestern Indians with special reference to depth of planting and adaptation to arid regions. Among the conclusions is this statement, p. 266:

"American agriculture is under obligation to the American Indian for having developed the maize plant to a high state of efficiency and for having adapted it to a wide range of environment."

90. Congrès international du maïs. 1st, Pau, 1930. Premier congrès international du maïs à Pau en 1930. 2v. [Pau, Imprimerie artistique et commerciale de l'Indépendant 1933-34] 59.9 C767

A contribution on Le Maïs dans le Monde by J. A. Doleris places the birthplace of maize in the old world before its discovery by Columbus (v. 1, pp. 15-17). On the other hand, a Note sur l'Origine du Maïs by Etchats argues that maize was cultivated in western Asia in 1204.

91. Cook, Orator Fuller. The American origin of agriculture. Pop. Sci. Monthly 61: 492-505. Oct. 1902. 470 P81

"As long recognized by historians and ethnologists, maize was the most important factor in the material progress of ancient America, and the American civilizations remained on a much more strictly agricultural basis than those of the old world, a fact not without practical significance to modern agriculture since it undoubtedly conduced to the more careful selection and improvement of the many valuable plants which we owe to the ancient peoples of America." - p. 501.

92. Cook, Orator Fuller. The debt of agriculture to tropical America. Pan Amer. Union. Bul. 64(9): 874-887. Sept. 1930. 150.9 M76
Reprinted in Smithsn. Inst. Ann. Rept. 1930/31: 499-500. Washington, D. C., 1932. 500 Sm6R
"The extent to which our present civilization has drawn upon the native agriculture of tropical America is seldom recognized and is little understood by the general public... Civilization is made possible by agriculture, and the best prospect of understanding civilization is through the study of agriculture...A debt of appreciation is due to the prehistoric domesticators of food plants who opened the way of advancement for the race." - p. 874.
"The native agriculture of America had an essential unity and continuity over both continents. From Canada in the north to Patagonia in the south maize was the principal human food. The local maize cultures were endlessly varied and differently combined with other crops, but maize was the chief reliance over most of the agricultural area." - p.879.
"Likewise in Mexico and in Guatemala all of the ancient specialized systems of agriculture were applied to the production of maize. Our preponderant cultivation of maize in the United States is in line with the tradition of ancient America." - p. 880.

93. Cook, Orator Fuller. Food plants of ancient America. Smithsn. Inst. Ann. Rpt. 1902/03: 481-497. Washington, D. C., 1904. 500 Sm6R
The writer devotes a short section to the transition from root crops to cereals, pp. 491-493, in which he makes the following statements:
"Without reasonable doubt, maize is the oldest of cereals. The large, soft kernels which distinguish it from all other food grasses would render it easily available among the meal-eating aborigines of America, and everywhere in tropical America maize is still prepared for food by methods adapted to root crops...
"As long recognized by historians and ethnologists, maize was the most important factor in the material progress of ancient America, and the American civilizations remained on a much more strictly agricultural basis than those of the Old World."

94. Cook, Orator Fuller. Milpa agriculture, a primitive tropical system. Smithsn. Inst. Ann. Rpt. 1918/19: 307-326. Washington, D. C., 1921. 500 Sm6R 1918/19
A detailed account of the milpa system and its distribution.
The milpa system which is used generally by primitive people in the tropics is a nomadic and predatory and self-limiting system of agriculture which destroys the fertility of the soil, and is able to support only a limited population, according to this writer. The monuments of Central America indicate that large communities did exist, and possibly the limitations of the milpa system explains why the ancient centers of population were abandoned.

95. Cook, Orator Fuller. Peru as a center of domestication. Tracing the origin of civilization through the domesticated plants. Jour. Heredity 16(1,3): 33-46, 95-110. Jan., Mar. 1925. 442.8 Am3
Reprinted in slightly abridged form and with only 12 plates in the Smithsn. Inst. Ann. Rpt. 1925: 509-532. 1926.

"In the present state of botanical science there can be no question that each of the cultivated plants had an original status as a wild species, and was adopted by primitive man at some time and place, which it is our problem to locate as definitely as possible. The domestication of a new food plant was a step of the utmost importance in the subsequent history of mankind, not only in the country of origin but even in remote regions to which many plants have been carried...

"That the agriculture of the native peoples of North and South America was not introduced from the Old World but had an independent, indigenous development, is demonstrated by the fact that the American agriculture was based on native American plants...

"Biology shows that the system of agriculture was indigenous in America, since American plants were used, and also affords indications of the great antiquity of agriculture in America. Such evidence comes from comparing the cultivated species of plants with their nearest wild relatives...it has not been possible to identify with certainty the wild type of several of the most important species as corn."

The author notes that in Mexico and Peru "agriculture was based on the same plants...In Mexico, as in Peru, the chief food product was Indian corn or maize, and many other plants of the lower Peruvian valleys were cultivated throughout tropical America, including Mexico... That the same series of crop plants should attain such a wide distribution shows that many migrations took place and that many contacts were established...

"The specialized worship of maize gods among the ancient Mexicans, and the many traditions of the coming of maize among the more northern tribes, are indications of an imported culture."

96. Cook, Orator Fuller. Staircase farms of the ancients. Astounding farming skill of ancient Peruvians, who were probably the most industrious and highly organized people in history. Natl. Geogr. Mag. 29(5): 474-534. May 1916. 470 N213

The major share of this discussion describes the terracing and irrigation and farming systems of ancient Peru, but there is some material (pp. 507-510) on maize which is said to have been domesticated in this region.

"That the cultivation of corn goes very far back in Peru is indicated not only by the abundance of specimens found in the ancient graves, but by the fact that the type of maize that furnishes the bulk of the Peruvian crop is peculiar to that region." - pp. 507-508.

The writer also states on p. 507, "that more plants appear to have been domesticated in the Peruvian region than in any other part of America."

97. Cook, Orator Fuller. Vegetation affected by agriculture in Central America. U. S. Dept. Agr. Bur. Plant Indus. Bul. 145, 23pp. 1909. 1 P69B no.145

The writer devotes a section, pp. 8-11, to the diverse systems of maize culture, in which he states:

"The problem of tracing relations between agriculture and natural

conditions in Central America is much simplified by the fact that one staple crop is grown over the whole area...In spite of endless local diversities among the native inhabitants they have a general agricultural unity, for they all depend on Indian corn, sometimes to the almost complete exclusion of other kinds of food...

"The large numbers and varied characters of these specializations of varieties and of cultural methods afford important evidence of the very great antiquity of the primitive agricultural civilizations in Central America." - pp. 8-9.

98. Corn industries research foundation. Corn in industry; a handbook of information on the starches, syrups, sugars and other industrial products made from the corn kernel; including a brief historical sketch about corn. Manufacturing processes, description and uses of products, importance to agriculture. Ed. 2, 64pp. [New York City, 1938.]
309 C81 Ed. 2

As its title implies, this bulletin deals chiefly with the industrial utilization of corn. However, a section, About Corn, pp. 43-50, is of particular interest because it brings out the importance of corn in American history and in the civilization of the Indians as well as that of the white settlers of the western hemisphere.

"A famous historian states that 'nothing worthy of the name of civilization has ever been founded on any other agricultural basis than the cereals.' Certainly this is true of both the Indian and white civilizations in North America, neither of which ever could have progressed as rapidly or as far without corn. Man's early wealth was measured by the amount of his crops in excess of his own immediate needs. Most civilizations could depend on the labor of domestic animals to increase the yield of their fields, yet the aboriginal American cultures rose to their peaks by unaided human labor. Before the arrival of Europeans there were no domestic animals on this continent. But there was corn, that amazingly fruitful cereal which we take so much for granted in these days.

"The Indians never accepted its existence as a commonplace. They invariably expressed their gratitude for it in religious exercises and in tribal myths...If such worship of corn seems by our standards to be extraordinary or cruel, it should be remembered that the very lives of these several nations centered around the success of the corn crop. To them, moved by the human instinct for survival, it was the most important thing in the world... It can be grown in detached spots, here and there, close under the eye of the jealous warrior who fears the intent of hostile tribes against his winter's food supply. Without these characteristics, the Mayans, Aztecs and Incas might not have built their civilizations; Anglo-Saxons could not have had that security which made colonization possible; the Middle-West would have had to wait another hundred years to be populated; and the United States might have remained a small Atlantic nation instead of rising to the mighty power it is today." - pp. 44-46.

"The first Europeans to recognize corn's importance were the English colonists on our Atlantic coast. Wheat they tried, and it failed them; and when the very existence of the Massachusetts and Jamestown settlements hung in precarious balance during those first hard winters, it was corn that saved them. Captain John Smith forced every family in his little band to plant corn. They were rewarded abundantly. Like the sparse crops of the first dawn of civilization it became a means of exchange, a form of money. Surplus corn built up trade and commerce, encouraged the growing stream of immigrants crossing the Atlantic, and opened the gates to wealth and prosperity.

"But corn did more than that. Its short season, certainty of production, and ease of cultivation lured the homesteader inland on trails opened up by woodsman, trapper and explorer. The settler knew that corn would grow wherever he planted it, and that within a few short weeks it would yield him a food supply. It promised personal independence and urged apprentice, laborer and poverty-shackled freeman to seek a new and better life in the lush Middle-West." - p. 47.

"The world soon knew this yellow grain from America. Its addition to universal resources made the grain supply adequate for the first time in history. The Americas have never known a famine, but Europe, Asia, and Africa, due to crop failures in the older cereals, have often been ravaged by disastrous shortages...

"The immediate effects of the new cereal, however, were more apparent in North America, where the agricultural civilization established by the British determined the political complexion of the new territory... - p.48

"Trade, commerce and industry, firmly grounded on an agricultural foundation, grew and raised the United States to world power. Serried rows of corn stretching from the Alleghenies to the Rockies remain today, as they were during the upward struggle, one of the chief sinews of America's might." - p. 50.

99. Cox, Isaac Joslin, ed. The journeys of René Robert Cavelier Sieur de La Salle as related by his faithful lieutenant Henri de Tonty...[and others] together with memoirs, commissions, etc. 2v. New York, A. S. Barnes & co., 1905. Libr. Cong. F1030.5.C87

These volumes have no index but a brief leafing through them reveals a few references to corn. Corn was brought by the Indians and little presents were made to them in return. - v. 1, p. 137. Corn is also mentioned on pp. 150, 156, 195 of v. 1 and on p. 203 of v. 2.

100. Cunningham, J. C. Mexico and maize. Mod. Mexico 8(12): 12-16. May 1937. Pan Amer. Union Libr.

"Maize differs from most other economic plants. It exists no where in a wild form. It never escapes cultivation...

"For a comparatively long time maize and the knowledge of its culture was the possession of certain tribes and nations in Mexico and in Peru, where it had been introduced. Here two great centers of civilization developed.

"The first astronomical observatory on this continent seems to have been erected by the Mayas to study the seasons and better improve their

one great crop, corn. Wealth accumulated, art developed, splendid buildings and roads were constructed.

"The Mayas and the Aztecs prided themselves on being 'Eaters of maize' as contrasted with savages known as 'Suckers of blood'...

"When Cortez and Pizarro invaded these two regions about twenty five years after Columbus reached these shores, they had one burning desire. Gold!...They saw the fields of corn and lived from the grain stored in the government's well constructed stone granaries. This supply was ancient crop insurance."

The author discusses briefly the following topics: Corn originally a food for man; Corn as a food for animals, corn and industry; Corn or maize in the fields of science; and Maize and art.

"The exquisite silver work of the Mexican artists often includes allusions to this great crop. The ancient pottery of the Incas and the Aztecs made use of the corn ear again and again. The feather work, the paintings and the woven fabrics of Mexico ancient and modern [make] use of the corn theme. An Aztec ceremonial urn rescued from the ruins of an ancient temple shows some artist's idea of a maize god and his very faithful copy of the maize ear of his day." The story of maize "began in the heart of Mexico and now touches almost every field of human activity around the world."

101. Cushing, Frank Hamilton. Zuñi breadstuff. 673pp. New York, Museum of the American Indian, Heye foundation, 1920. (Indian notes and monographs, v. 8). 389 C95

The writer gives a description of the everyday life and food habits of the Zuñi Indians with whom he lived from 1879 to 1884. He includes a great deal of information on corn planting and growing and harvesting, corn cookery, and the place of corn in the ceremonials and myths and folktales of these people.

"Indeed so important to the Zuñi is his corn, that it plays an all-essential part, not only in his daily but also in his industrial, religious, and mythological life, and even in the tales with which he amuses the children about the fireside in winter-time." - p. 18.

"Although he continued to gather and prepare wild fruits, nuts and grains, one added source of supply - corn - outweighed them all; for was it not the author of his improvements, the object of his affection, care and devotion, the sure promise of his mastery of the desert?" - p. 264.

"Simplest of cereal foods, as it was, one variety or another of this parched corn formed one of the chief articles of diet with not only the people here described, but among all the more advanced tribes of ancient America; in proof of which one need not search far into the chronicles of our early explorers and pioneers to find repeated mention of it. Nor are the monuments of prehistoric times scant in their testimonials of its universality. Among the forest middens of central New York, in the ashes of excavated mounds along the Mississippi valley, frequently in the granaries, cliff-ruins and caves of the great Southwest, and even in the collections from the huacas of ancient Peru, I have found these toasted grains carbonized by age, yet preserved unbroken long after the very bones of the hands that poised the pot they were parched in have crumbled to lime." - pp. 267-268.

102. [Dalechamps, Jacques] Histoire générale des plantes...sortie latine de la bibliothèque de M^e Iaques Dalechamps, puis faite françoise par M^e Iean Des Movlins. 2v. illus. Lyon, Chez les héritiers G. Rouille, 1615. Libr. Cong. QK41.D13 Office

Describes the maize plant, its cultivation by the Indians, and its use as food.

103. Davenport, Helen W. Mondamin, the spirit of the Indian corn. New Eng. Mag. (n.s.) 29(2): 239-246. Oct. 1903. Libr. Cong. AP2.N38

"Without this knowledge of the Indian corn, and the supplies sold them by the Indians, the Pilgrim Colony, might well have perished, so rough and unyielding was the soil and climate which it had to encounter." - p. 242.

Corn "is now as much the staff of life to the White Man, as it was years ago to the poor Indian, who wrestled and threw down 'Mondamin, the spirit of the Indian Corn.'" - p. 245.

104. Davis, Emily Cleveland. Ancient Americans; the archaeological story of two continents. 311pp. New York, H. Holt & co. [1931] Libr. Cong.

A popularly written archaeological story of North and South America. Among the references to corn are the following:

Ch. 6, pp. 73-85, tells of the basket makers of the American Southwest who "date from the time of Christ, or even two or three thousand years earlier." The change that the acquisition and planting of corn made in their mode of life is brought out on p. 77. "Government agricultural experts who have handled some of the Basket Makers' corn assign the ears to a type known as Tropical Flint, and pronounce it a primitive form of corn unlike any grown today. This corn is different from corn grown by the Pueblos, who developed into better farmers than the Basket Makers ever were." - p. 80.

Ch. 15, pp. 240-252, describes the seven wonders of ancient America developed by the Indian. First on the list is "The conquest of corn." How corn "bears testimony to the Indian's patient, isolated effort" is discussed on pp. 241-243.

"The greatest gift that the South gave to its Northern neighbors was the gift of corn. From Mexico or Peru, whichever it was, the valuable seed was passed along until it reached the farthest limits suitable for its growth." - p. 259.

Ch. 18, pp. 272-282, is entitled We Owe These to the Indian. The various ways in which corn was used as a food are described briefly on p. 273.

105. Dawson, Claude I. Mexico's economic condition not improved by corn situation. U. S. Dept. Com. Bur. For. & Dom. Com. Com. Rpts, no. 21, p. 512, May 22, 1922. 157.7 C76D

"The fact that corn is the chief food essential to the average Mexican causes the condition of supply and demand of this commodity to have a very important bearing on the general economic situation of the country. The recent decree of the Mexican Government ordering the removal of all duty on corn exported from Mexico raises the presumption that the

country produced an excess above domestic needs. This theory is borne out by press information...

"On the basis of [the figure given] it is calculated that the exportable production will amount to some 300,000 tons, which explains the order removing export duty. But the availability of the crop for home consumption is considerably in doubt for the reason that means of distribution are inadequate and expensive. While there will be a surplus in many parts of the country, actual shortage will exist in others, due to small production and expense of transportation.

"The bulk of the 1921 corn crop of the Republic was raised in the Southern section, which is territorially the smallest, where the population is more numerous, and where means of communication are probably more efficient in relation to the territorial area. Thus the wide difference in production between the northern and the southern States permits foreign competition in corn more easily in the northern section of the country than in the south. If efforts continue in Mexico toward discouraging importations from abroad with the view of improving the country's trade balance, presumably continued relatively large purchases of corn will retard an increase in the importation of nonconsumable materials for the rehabilitation of its industries."

106. Deane, Samuel. The New England farmer; or Georgical dictionary. Containing a compendious account of the ways and methods in which the important art of husbandry, in all its various branches, is, or may be, practiced to the greatest advantage in this country. Ed. 3, 532pp. Boston, Wells and Lilly, 1822. 30.1 D34 Ed. 3

The article on Indian corn, pp. 215-227, is a practical treatise on maize growing, which takes into account its effect on the soil, use of fertilizers, seed selection, methods of cultivation, etc. On p. 216, the writer states: "In our new settlements, bordering on the wilderness, it seems to be of more importance than in other places; because the stalks, leaves and husks, being good fodder, supply the new beginners with winter food for their cattle, before hay can be raised."

107. Delabarre, Edmund Burke, and Harris, H. W. Indian corn-hills in Massachusetts. Amer. Anthropol. (n.s.)22(3): 203-225. July-Sept. 1920. Libr. Cong. GN1.A5

This gives a clear picture of the Indian corn fields, with their rows of isolated hills cultivated in the same place year after year. The manner of clearing land and ways of cultivating the fields are outlined. The remains of these perfectly preserved Indian corn-hills may be seen in meadows and untilled fields in several sections of Massachusetts and constitute "genuine relics of Indian cultivation of the land." - p. 224.

108. Denig, Edwin Thompson. Indian tribes of the Upper Missouri; edited with notes and biographical sketch by J. N. B. Hewitt. Smithsn. Inst. Bur. Amer. Ethnol. Ann. Rpt. (1928/29)46: 375-628. Washington, D. C., 1930. 500 Sm63 v. 46

Bibliography, pp. 627-628.

The following paragraph indicates the place of corn in the culture of these Indian tribes:

"The Indians who raise corn, etc. (Mandan, Gros Ventres, and Arikara), do not do so from any scarcity of game or apprehensions on that score, but have done so beyond the recollection of any trader, or even of themselves. It appears to be a desire to possess something else to eat besides meat, and a custom handed down to them by their forefathers. Their corn is entirely different from any raised in the States, and is the real original maize discovered with the continent, the seed still kept in its original purity." - p. 463.

109. Denis, Pierre. The Argentine Republic. Its development and progress. Tr. by Joseph McCabe. 296pp. London, T. Fisher Unwin, ltd. 1922. Libr. Cong. F2815.D392

Bibliography, pp. 277-289.

"Maize-growing started on the banks of the Paraná, where it was already paramount in 1889, between Campana (north of Buenos Aires) and San Nicolas. In 1865 it advanced up the Paraná as far as the Santa Fé province (Constitución) and spread over the interior for some sixty miles in the Salto department. In the next few years it made rapid progress toward the west and northwest, covering the departments of Pergamino, Rojas, and Colón, and part of General Lopez, San Lorenzo, and Constitución in the province of Santa Fé. Export of Argentine maize on a large scale began in 1895. Flax-growing was not added to maize until 1900.

"The heavy land requires a good deal of harrowing, and the weeding and harvesting of the maize give employment to a comparatively large staff. The estates are of moderate size, often only 50 hectares. Ownership was not divided at the period of colonization, the land, thanks to the breeders, having already acquired so high a value that the colonists could not buy it. On the lands which have been farmed out there has developed a rural, and often far from docile, proletariat. It is in the maize region that the worst agricultural strikes have taken place. The struggles of the owners and the colonists are the more prolonged because the sowing of the maize can be put back to the end of the spring without much harm being done. The adjoining zone of the Paraná produced some of the maiseros who have scattered over the northwest. But the modern colonies include, in addition, a large proportion of immigrants who have recently landed from Italy and Spain. The maize growers do not mix with the wheat-growers. Each group has its own area...

"At the time when agricultural colonization began, it was admitted that farming was the best way to exploit the soil, and that the Pampa would sooner or later pass from the pastoral to the agricultural cycle; or, to use the local phraseology, that the 'colony' would replace the ranch everywhere. This idea was wrong. The only area in which the facts seem to give it any support is the corn belt." - pp. 197-200.

110. Densmore, Frances. Uses of plants by the Chippewa Indians. Smithsn. Inst. Bur. Amer. Ethnol. Ann. Rpt. (1926/27)44: 275-397. Washington, D. C., 1928. 500 Sm63 v. 44

The use of dried corn silk as a seasoning is described in two sentences on p. 318. The use of corn for food is described briefly on p. 319.

111. Dent, Hastings Charles. A year in Brazil. 444pp. London, K. Paul, Trench & co., 1886. Libr. Cong. F2513.D45

Contains a number of references to maize and its use as food and feed, as straw for cigarettes and for mattresses. (Vide index)

112. Dicken, Samuel N. Corn and wheat in Mexico's changing economy. Jour. Geogr. 38(3): 99-109. Mar. 1939. Libr. Cong. G1.J87

Notes the development in Mexico of "a silent but significant rivalry... between corn and wheat. For corn has been the mainstay of Mexico for centuries and is today, but most of the country is ill suited to its growth. That corn has maintained its preëminent place, with merely a slight decline, is evidence of the long delayed industrial and agricultural revolution." But changes are occurring in agriculture and means of transportation. "Consumer demand is changing also and the production pattern will change to fit it, more wheat bread and fewer tortillas, more wheat and less corn. The following discussion is concerned with the fundamental factors in the production of corn and wheat and the tendencies toward their redistribution which, it is believed, represent the most important problems in Mexican agriculture."

113. Diguet, Léon. Le maïs et le maguey chez les anciennes populations du Mexique. Société des Américanistes de Paris. Jour. (n.s.)7(1-2): 5-35. 1910. Libr. Cong. E51.S68

The two most important plants in ancient Mexican agriculture are said to have been maize and maguey or agave, they being able to supply all the needs of the peoples of the plateau of Anahuac. They are said to have been cultivated side by side in the same field on the high Mexican plateaus. Though the use of maize extended to all the territories occupied by the civilized nations of the two Americas, and though its place of origin is unknown, its use is said to have been more complete and more varied among the natives of the plateau of Anahuac than anywhere else.

The different Mexican names applied to maize in its different stages of development are enumerated, and an account is given of the various uses made of the stalk and the grain for food, drink, and for medicinal purposes.

From the ancient religious practices it is deduced that maize and agave were thought to provide the food and drink that were most necessary to human existence. The rôle of the maize goddess (Centeotl) is said to be analogous to that of the Greek Ceres. Festivals in her honor were celebrated by the Mexicans four times a year.

114. Dobritzhofer, Martin. An account of the Abipones, an equestrian people of Paraguay, from the Latin of Martin Dobrizhoffer... 3 v. London, J. Murray, 1822. Libr. Cong. F2679.D63

Translated by Sara Coleridge.

Contains a brief description of maize and its use for food and drink. "The Indians find this grain, however prepared, highly useful in strengthening the body, increasing the blood, and lengthening life. Neither could we discover anything better for fattening hens and other animals." - v. 1, pp. 425-427.

115. Dodd, William Edward. The old South. Struggles for democracy. 312pp. New York, The Macmillan co., 1937. 277.002 D66

This is the first volume in a planned series of four on the evolution and collapse of the old South.

The place of corn in the first English settlement at Jamestown is briefly discussed on pp. 23-24 and 29-30. Captain John Smith's success in obtaining Indian corn from the natives and thus saving the settlers from starvation is brought out. The use of corn as a food by the settlers is also brought out on pp. 39-41.

116. Dominguez, Zeferino. Agricultura. 391pp. [Mexico, Imprenta y papelería "La Helvetia," 1913] 31.5 D71

Maize, its production and use in Mexico, is the author's main theme. He asserts that the solution of all Mexico's political and economic problems depends on the maize harvest. If the harvest is good the farmer can meet his obligations, pay his debts, or put money in the bank. He can buy machinery and blankets for his workers, and the manufacture of blankets gives work to many millions. When the harvest is good, railways do more business, wages are better, and the Government gets more money. The workers on the estates are adequately nourished and able to work to produce sugar, coffee, tobacco and other products. Mexico is said to need 43,800,000 hectolitres of maize to feed the population without taking into consideration the amount used in industry. But, in normal times, the production is 30,000,000 hectolitres. And so large quantities of maize must be imported annually. Mexico's most important problem is the production of more maize. The possible solution of this problem is discussed.

117. Dorsey, J. Owen. Omaha sociology. Smithsn. Inst. Bur. Ethnol. Ann. Rpt. (1881/82)3: 205-370. Washington, D. C., 1884. 500 Sm63 v. 3

In a short section called Cultivation of the Ground, on p. 302, the customs observed in collecting and distributing seed for corn planting and deciding upon the proper time to plant are described. Pages 304-305 contain descriptions of the Omaha varieties of corn (white, blue, yellow, spotted, reddish-blue, red, figured red and yellow, sweet, and squaw) and of the modes of cooking corn. It was prepared by boiling on the cob, roasting on the ear, made into hominy and boiled into a mush, dried for hominy or meal to be made into cakes and dumplings, parched, or simply dried and put away for future use.

118. Duchesne, Édouard Adolphe. Traité du maïs ou blé de Turquie contenant son histoire, sa culture et ses emplois en économie domestique et en médecine. 366pp. Paris, Madame Huzard, libraire, 1833. 59 D86

Quotes a number of writers with regard to the origin and antiquity of maize, and its use in the new world as a food and in religious ceremonies.

119. Dunn, William Edward. Peru; a commercial and industrial handbook, by W. E. Dunn...and other representatives of the United States departments of state, commerce, and agriculture. U. S. Dept. Com. Bur. Foreign and Dom. Com. Trade Prom. Ser. 25, 530pp. Washington, D. C., 1925. 157.54 T67 no. 25.

In a section on Corn, p. 133, the writer states that it is the most important grain crop of Peru, that it was the only cereal raised by the Indians before the Spanish conquest and was one of their principal foods, and that "it constitutes a larger proportion of the food of the working classes in general than any other crop."

120. Durand, Edward Dana. American industry and commerce. 653pp. Boston, New York [etc.] Ginn and co. [1930] 280.12 D93

Ch. VIII of this book is devoted to Agriculture and the Foodstuffs Industries. The following is quoted from p. 368 which is part of a section entitled The Ranking of the Crops: "From the standpoint of value corn leads all American crops, representing one fifth of the total. The extraordinary adaptation of the soil and climate of the Middle West to this cereal, and its high efficiency as an animal food, give it a position such as it occupies in almost no other country."

Section 8 of this chapter, pp. 391-402, is devoted to major individual crops. Two paragraphs on p. 392 are devoted to corn. Corn is said to be the crop of greatest value; three-fifths of the world's production being grown in the United States. It ranks far below both cotton and wheat as a direct money crop. "Corn owes its position in American farm economy to its peerless qualities for feeding animals and to the high meat consumption of the country." Human consumption accounts for about one twentieth of the output and very little is exported. Production is concentrated in the Corn Belt, although it is produced practically everywhere except in New England and the Far West. "In any section where corn grows well it not only creates more food value per acre than any other cereal crop, but also usually pays better returns, despite the fact that it requires tillage during the growing season, as the other grains do not."

121. Earle, Alice Morse. Indian corn in colonial times. Chatauquan 26(6): 586-590. Mar. 1898. Libr. Cong. AP2.C48

A description of the uses of maize by the New England colonists.

"...its abundance, adaptability, and nourishing qualities not only saved the colonists' lives but altered many of their methods of living, notably those of cooking and their tastes in food...The English colonists learned early in the day that they could not depend on European food supplies. In Virginia they had many starving-times before all were convinced that corn was a better crop for settlers than wine, silk or any of the many hoped-for profitable productions which could not be eaten...The governor...encouraged and enforced the growing of corn...

"Famine and pestilence had left eastern Massachusetts comparatively bare of inhabitants at the time of the settlement of Plymouth; and the vacant corn-fields of the dead Indian cultivators were taken and planted by the weak and emaciated Plymouth men, who never could have cleared new fields...From this planting sprang not only the most useful food, but the first and most pregnant industry of the colonists...The culture of Indian corn not only insured domestic comfort and plenty to the colonists everywhere, but it brought a large profit and means of exchange...a settler planted 13 gallons of seed and raised from it 364 bushels of corn. This he sold to the Indians for beaver; his profits when the beaver was sold were £327. Maize also proved an available

and much needed currency for carrying on the internal trade...In October, 1631, the Massachusetts court passed an ordinance that corn be received in payment of debts, unless money or beaver were named in the contract...Soon corn was made a universal legal tender." - pp. 586-587.

The uses of corn in cookery are described, including the methods of preparation which were learned from the aborigines.

"It was held to be the most sustaining food known, and in the most condensed form. Both Indians and white men carried it in a pouch on long journeys and mixed it with snow in the winter and water in summer... Many games were played with the aid of kernels of corn; fox and geese, checkers, 'hull gull, how many,' and games in which corn served as counters... A special use of corn should be noted. By order of the Massachusetts government in 1623 it was used as ballots in public voting. At elections of the assistants a kernel of corn was deposited to signify a favorable vote upon the nominee, while a bean signified a negative vote, 'and if any freeman shall put in more than one Indian corn or beane he shall forfeit for every such offence Ten Pounds.' The harvesting of the corn afforded one of the few scenes of gaiety in the lives of the colonists... It is a curious and significant fact to know that the first patent for an invention issued in England to an American was for a preparation of Indian corn [Tuscarora rice, whose curative values evidently proved worthless]." - pp. 589-590.

122. East, Edward Murray. A chronicle of the tribe of corn. Pop. Sci. Monthly 82(3): 225-236. Mar. 1913. 470 P81

In this consideration of the origin and development of maize, the writer states:

"The story of the birth and evolution of maize, the plant at the basis of our national prosperity, is of interest not only to agriculturists and botanists but to historians and philosophers, for it is one of the crops whose cultivation is linked with the beginnings of civilization." - p. 225.

"On the other hand, no one has ever questioned the fact that maize was widely cultivated in America at the time the country was discovered by the Europeans. It was the staple crop in both continents and had names in all the native languages. Its antiquity and importance are evidenced by its prominence in the religious rites of the people. The North American burial mounds, the tombs of the Incas and the temples of Mexico were made depositories of the seeds just as the tombs and temples of Egypt treasured wheat and barley." - p. 231.

123. Edwards, Everett Eugene. The agriculture of the American Indians prior to the European conquest. 9pp., processed. Washington, D. C., U. S. Dept. of agriculture, Bureau of agricultural economics, 1934. 1.9 Ec752Agi

"A revision and condensation of the introduction to the writer's Agriculture of the American Indians; A Classified List of Annotated Historical References, issued by the U. S. Department of Agriculture Library as its Bibliographical Contributions 23 (2d ed. Washington, 1933), prepared primarily for use in the course on the history of American agriculture given in the Graduate School of the U. S. Department of Agriculture." - Footnote on p. 1.

"As a result of the gradual spread of the cultivation of maize, beans, and squashes to the north and south, agriculture came to be practiced in widely scattered parts of the Western Hemisphere." - p. 2.

"In the eastern maize area, where the Englishmen, who were the first colonial farmers of the future United States of America, settled, corn was the main agricultural product." - p. 3.

"The Chibcha peoples of Colombia raised maize, potatoes, sweet potatoes, manioc, beans, tobacco, coca, and cotton. The other peoples of Colombia, although they did more hunting, also cultivated corn. At the time of the Spanish conquest the adjoining highlands of Venezuela were occupied by a hunting and maize-growing group. At that time, Ecuador, then partly controlled by the Inca empire, depended on corn as the main source of food except in the highest altitude, where quinoa took its place." - p. 4.

Development of the maize plant, preparation of corn for eating, and methods of planting are discussed on p. 6.

124. Edwards, Everett Eugene. American Indian contributions to civilization. 13pp., processed. Washington, D. C., U. S. Dept. of agriculture, Bureau of agricultural economics, Division of statistical and historical research [Sept. 1934] 1.9 Ec752Ai

Also published in Minn. Hist. 15(3): 255-272. Sept. 1934. Library of the U. S. Bureau of Agricultural Economics has a reprint of this.

"A paper presented on July 14, 1934, at the Shakopee session of the twelfth state historical convention held under the auspices of the Minnesota Historical Society."

Citations to works referred to in the text are given on pp. 9-13.

"The chief contribution of the Indian is his agricultural plants, methods, and processes." - p. 5. This contribution, which includes maize, is discussed on pp. 5-8.

125. Eggleston, Edward. The aborigines and the colonists. Century Illus. Monthly Mag. 4(1): 96-114. May 1883. Libr. Cong. AP2.C4

Lessons learned from the barbarians, pp. 98-101. This section includes a discussion of corn - how it saved the first settlers from starvation and how the settlers adopted the Indian method of planting and cooking it.

126. Embree, Edwin Rogers. Indians of the Americas; historical pageant. 260pp. Boston, Houghton Mifflin co., Riverside press, Cambridge, 1939. Libr. Cong. E58.E63

The story of the Inca, Maya, Aztec, Pueblo, Plains, and Iroquois Indian civilizations, all of whom were conquered by the white men, are interestingly told in this volume. In many places the writer tells of the importance of corn to the red men.

"In agriculture he produced an ample and nourishing subsistence... The greatest of the native American staples is maize, or Indian corn. This crop was the basis of Indian agriculture. It was to America what rice has been to Asia." - p. 22.

"In the fertile region of Central America these people began to change from a roving life of hunting and fishing to a more settled life in villages. The change was made possible by the great discovery that maize or Indian corn could be planted and harvested. This idea which seems to us so simple as to be a matter of course, meant a veritable transformation of life to the ancients. Until planting and harvesting were invented there was no settled life. There was only a nomadic existence - wandering about, hunting, fishing, living on wild herbs and roots. In all parts of the world the discovery of agriculture was the beginning of human advancement... Agriculture in America grew up about maize... Probably a variety of this grass [teosinte] was turned into true maize, producing the rich yellow ears of corn on which men in America have thrived ever since." - pp. 28-29.

In writing of the Aztecs of Mexico, the writer states, p. 58, that "Maize was the staff of life." In his discussion of the Inca empire, he states: "The common people lived chiefly on maize, potatoes, and charqui (dried or 'jerked' meat of the llama) washed down by chicha, a native beer made from corn." - p. 92.

"In cultivating maize, the chief crop of Peru as elsewhere in America, the whole populace took part." - p. 94. This participation is then described; and the place of corn in ceremonials is referred to in other parts of the book.

127. Emerson, William D. History and incidents of Indian corn and its culture, including statistical, analytical and other tables. 464pp. Cincinnati, Wrightson & co., printers, 1878. 59 Em3

Although this volume consists chiefly of material on corn production, cultivation, and uses, and statistics on corn, it does have a chapter on the Early History of the Maize Plant, pp. 22-34. Here the writer states that maize was being cultivated by the many native Indian tribes with which Columbus and the other explorers and colonists came in contact, and that these aborigines taught the white settlers how to cultivate and utilize the maize. He describes it as the New World's gift to Old, a gift that gave food to a greater number of the human race than any other of the cereals, with the exception of rice.

128. Erwin, A. T. Rare specimen of zea mays var. saccharata [from the Aztec ruins, New Mexico] Science (n.s.)79(2061): 589. June 29, 1934. 470 Sci2

"A specimen of maize, collected by Earl H. Morris, archeologist, and identified by the writer as Zea Mays var. saccharata, is of special interest because of the fact that it is the only specimen of sweet corn so far identified from the numerous historic collections of corn recovered in the United States... The fact that sweet corn existed in pre-Columbian times is proved by this specimen."

129. Erwin, A. T. Sweet corn - its origin and importance as an Indian food plant in the United States. Iowa State Col. Jour. Sci. 8(3): 385-389. Apr. 1934. 470 Io9

Literature cited, p. 389.

From his review of early American literature and from his examination of the archeological evidence, the writer concludes that sweet corn was not a pre-Columbian food plant of the North American Indian, but was relatively recently introduced into the United States. He states however, "The fact that field corn was widely grown in North America previous to the invasion of the white man is well established." - p. 385.

130. Estabrook, Mrs. Emma Franklin. Givers of life; the American Indians as contributors to civilization. 101pp. Albuquerque, University of New Mexico press, 1931. Libr. Cong. E98.C9E8

The last chapter, The American Indian as Plant Experimenter and Agriculturist, contains statements about our debt to the Indians. The most valuable product given the white man by the red, was maize or Indian corn, which is still the chief crop in acreage and money value in the United States.

131. Faulkner, Harold Underwood. American economic history. 721pp. New York and London, Harper & brothers, 1924. (Harper's historical series) 277 F27

Fourth edition, published in 1938, in Library of Congress.

Selected readings at end of chapters.

In a section on geographical influence upon occupations, pp. 9-11, the writer calls attention to the "part played by the two greatest plants which America gave to the world - maize and tobacco." Maize "largely helped to fix the early settlements in North America.

"In later years our history was influenced by the climatic adaptability of certain regions to certain products... The fertility and climate of the upper Mississippi Valley made it ideal for the cultivation of corn, and hastened settlement." - p. 10.

"Of vegetable foodstuffs, cereals are the most important, and of these maize, or Indian corn, takes first place." - p. 18.

"Indian agriculture in the main was built up around the cultivation of corn and tobacco... Although far from efficient in their methods, the Indians produced at least a million bushels a year." - p.58.

Ch. X is entitled Agriculture from the Close of the Revolution to the Civil War. The following sentence is quoted from p. 228 of this chapter: "The southern soil was more adaptable to corn than the other cereals, and it served as the chief food for the slaves." During this same period the production of beef and pork declined, but "corn continued to be the agricultural backbone of New England." - p. 233.

Following the Civil War the production of corn fell off slightly for the country as a whole, but showed "a remarkable increase in the western states." - p. 382.

132. Fernández Guardia, Ricardo. History of the discovery and conquest of Costa Rica. Translated by Harry Weston Van Dyke. 416pp. New York, T. Y. Crowell co., [1913] Libr. Cong. F1546.F39

The aborigines of Costa Rica are said to have cultivated the soil in a very rudimentary manner. "The basis of their food was maize, and in the planting of the grain they alternated the fields, to avoid exhaustion of the soil." - p. 19.

133. Fewkes, Jesse Walter. The aborigines of Porto Rico and neighboring islands. Smithsn. Inst. Bur. Ethnol. Ann. Rpt. (1903/04)25: 3-220. Washington, D. C., 1907. 500 Sm63 v. 25

In a short section on Agriculture, pp. 50-53, the writer tells of clearing the vegetation away by fire, and also that irrigation was practiced in Cuba and other islands. He does not tell about corn culture, although he states that "Corn was one of the important articles of diet, but a bread called cassava, prepared from the root of the manioc was the main food supply... The two principal foods of the aboriginal Porto Ricans were a bread made of corn meal and the cakes called cassava, made of the root of the sweet and bitter yucca." - p. 51.

134. Fewkes, Jesse Walter. Ancient bread of Arizona. Baking Technol. 2(10): 314-317. Oct. 15, 1923. Libr. Cong. TX761.B35

In this description of bread making from corn among the Cliff Dwellers of the Southwest, the writer states that their main food was Indian corn.

"The advantages of having a ready supply of food that can be used when needed are many, and the influences ready food had on the elevation of a people above savages are many. It is evident that a people who had a food supply that would last without deterioration had much time for other activities. If a group of people has to hunt or fish whenever food is necessary, almost all the time is exhausted in this way; but if it can draw upon a supply of corn, much time is released for other purposes... Many of the arts peculiar to an agricultural people...owe their origin to the necessity for reducing the raw products to edible food." - p. 314. The invention of metates for grinding corn, making of baskets, pottery, etc., are some of these arts.

135. Fewkes, Jesse Walter. Antiquities of the Mesa Verde National Park; Spruce-tree House. Smithsn. Inst. Bur. Amer. Ethnol. Bul. 41, 57pp. Washington, D. C., 1909. 500 Sm63B no. 41

Illustrated with 21 plates.

On page 50, the writer states: "All indications point to maize, or Indian corn, as the chief food plant of the prehistoric people of this cliff-dwelling. This is evident not only from the presence in the ruins of metates and grinding stones, but also from the abundance of corn ears and other fragments discovered; corn husks and seed corn were especially plentiful in rooms and in the refuse-heaps. As in the case of the modern Pueblos the corn appears to have been of several colors, while the size of the cobs indicates that the ears were small with but few rows of seeds. In addition to cobs, fragments of corn stalks, leaves, and even tassels were found in some of the rooms."

136. Fewkes, Jesse Walter. Archeological expedition to Arizona in 1895. Smithsn. Inst. Bur. Amer. Ethnol. Ann. Rpt. (1895/96)17, pt. 2: 519-744. Washington, D. C., 1898. 500 Sm63 v. 17

There are scattered references to corn in the Hopi ceremonials, corn-maid dolls of the Hopi, corn-maid figures on Hopi pottery, Hopi symbolism of corn, corn pollen used in ceremonies, symbolic corn mound, cornmeal used in Navaho house dedication, etc..

Consult the index.

137. Fewkes, Jesse Walter. A prehistoric island culture area of America; a report on prehistoric objects from the West Indies in the museum of the American Indian (Heye Foundation) in 1914. Smithsn. Inst. Bur. Amer. Ethnol. Ann. Rpt. (1912/13) 34: 35-281. Washington, D. C., 1922. 500 Sm63 v. 34

On pp. 57-58, the author makes these statements:

"The highest prehistoric culture attained in the West Indies was an agricultural one. It was based on the cultivation of the yuca (Manihot manihot), a poisonous root out of which was prepared a meal, from which the so-called cassaba bread was made... Both Porto Rico and Haiti appear to have been densely populated, and the failure of the population to advance into a higher stage of development was due to the perishable character of the root or food plant cultivated. Corn and other cereals were not extensively used and there was no domesticated animal. It is evident that this culture was built on a root food supply which was clearly a product of environment."

A foot note on p. 58, has the following on corn:

"Corn (Zea mays) was introduced into the West Indies as a food plant shortly before the advent of the Spaniards. If sufficient time had elapsed its cultivation would have changed the form of cultural development based on root agriculture, unless as in the Lesser Antilles it had been destroyed by Carib who were pressing in upon it with such force that it could not survive."

138. Fewkes, Jesse Walter. Two summers work in Pueblo ruins. Smithsn. Inst. Bur. Amer. Ethnol. Ann. Rpt. (1900/01) 22(1): 1-195. Washington, D. C., 1904. 500 Sm63 v. 22

In describing the objects found in The Little Colorado Ruins, the author tells of the food bowls. The following is quoted from p. 101: "Many of the food basins contained seeds of maize or squash, and ears of maize from which the kernels had decayed were found in several bowls.

"The ears or cobs show that the maize was a small variety, like that found in Cliff houses and still cultivated by the modern Hopi farmers."

139. Finch, Vernon Clifford, and Baker, O. E. Geography of the world's agriculture. 149pp. Washington, D. C., U. S. Dept. of Agriculture, Office of the Secretary, 1917. 1 Ag364

Contribution from Office of Farm Management.

The section on Corn, pp. 29-34, of which almost 5 pages are maps and charts, shows the geographic origin and areas of production. The following statements on the importance of corn are of particular interest: "Corn is by far the most important crop in the United States. The acreage and also the value of the corn crop is greater than that of wheat, oats, barley, rye, buckwheat, rice, fruits, and nuts combined. The relative importance of corn as compared with other cereals has remained fairly constant since the first agricultural census of 1840, but the production per capita of the population shows an increase after the Civil War... Since corn is a highly productive crop, yielding on the average about twice as much grain and, including the fodder, over three times as much food per acre as either wheat or oats, the corn crop in the United States, within its optimum geographic limits, reduces

other crops, except cotton, to a subordinate position, and especially those which require labor at the same time of year. Corn is pre-eminently the American crop, grown on three-fourths of all the farms in the United States, which produces nearly three-fourths of all the corn in the world. Within the United States three-fourths of all the corn produced is grown in the Mississippi Valley... While a large part of the total corn crop is thus grown in a limited area, corn is an important crop in nearly all of the eastern portion of the United States... Thus the acreage devoted to corn constitutes over 75 per cent of the total acreage in crops in some of the mountainous counties of eastern Kentucky, where a moderately dense rural population derives its meager livelihood largely from the cultivation of small patches of corn, averaging 10 to 15 acres per farm. The production of corn is small also in Florida and in the southern parts of Alabama and Mississippi, where most of the land is still in forests, yet corn constitutes in this region over 50 per cent of the total land in crops. Corn is the principal source of food supply of the American people, but outside of the South very little of the corn is directly consumed by man. Most of the crop is fed to cattle or hogs, and consumed as beef."

140. Fiske, John. The discovery of America; with some account of ancient America and the Spanish conquest. 2v. Boston, Houghton, Mifflin & co., 1892. Libr. Cong. E101.F545

In the first chapter, Ancient America, the writer points to the importance of corn. "Maize or 'Indian corn' has played a most important part in the history of the New World, as regards both the red men and the white. It could be planted without clearing or ploughing the soil. It was only necessary to girdle the trees with a stone hatchet, so as to destroy their leaves and let in the sunshine. A few scratches and digs were made in the ground with a stone digger, and the seed once dropped in took care of itself. The ears could hang for weeks after ripening and could be picked off without meddling with the stalk; there was no need of threshing and winnowing...it yields with little labor more than twice as much food per acre as any other kind of grain. This was of incalculable advantage to the English settlers of New England, who would have found it much harder to gain a secure foothold upon the soil if they had had to begin by preparing it for wheat and rye without the aid of the beautiful and beneficient American plant." - pp. 27-28.

"It will be remembered the most conspicuous distinctive marks of the grade of culture attained by the Cordilleran peoples were two - the cultivation of maize in large quantities by irrigation, and the use of adobe-brick or stone in building." - p. 83.

141. Fletcher, Alice C., and La Flesche, Francis. The Omaha tribe. Smithsn. Inst. Bur. Amer. Ethnol. Ann. Rpt. (1905/06) 27: 17-672. Washington, D. C., 1911. 500 Sm63 v. 27

The chapter on the quest of food, describes the Omaha method of cultivating maize and its position in the tribal ceremonies and rituals. Maize and buffalo formed the chief food supply, and both are commemorated in their ritual songs. According to tradition, the

Arikara were the first to find maize and the Omahas received it from them. "When the Missouri river was reached [in their westward migrations] by the Omaha, they found the Arikara there cultivating the maize and living in villages composed of earth lodges - evidently a peaceful, sedentary folk." - p. 75.

142. Flint, Charles Louis. An essay on the history and importance of Indian corn as an agricultural product. Essex Agr. Soc. Trans. 1849: 147-160. Boston, Printed by George R. Carlton, 1849. 3 Es7 1849

Reprinted in N. Y. Agr. Soc. Trans. 1849: 281-293. 1850.

The writer gives an account of the maize plant, including statements from many other authorities as to its probable origin. On p. 153, he states:

"It is also a remarkable fact that it was universally cultivated on the western continent at the time when the Europeans landed there... the first Europeans who set foot on the New World saw among other wonders a gigantic wheat with long stalks, and that this wonderful wheat was maize. The harvesting of it was celebrated by the people with religious festivals. Sacrifices were prepared with it. With it the Mexicans formed idols. It constituted almost the only food for all the tribes in Mexico, in Peru, in Brazil, at the Orinoco and the Antilles. It served for money. A theft of seven ears the Mexican laws punished with death."

143. Forde, C. Daryll. Hopi agriculture and land ownership. Roy. Anthrop. Inst. Gt. Brit. and Ireland. Jour. 61: 357-405. July-Dec. 1931. Libr. Cong. GN2.A3

Cultivation and harvesting of the maize crop is discussed on pp. 389-393.

144. Frachtenberg, Leo J. Our indebtedness to the American Indians. Wis. Archeol. 14(2): 64-69. July 1915. Libr. Cong. E78.W8W8

Reprinted from Soc. Amer. Indians. Quart. Jour. 2: 197-202. July-Sept. 1914.

The gift of maize is particularly mentioned.

145. Furnas, Robert Wilkinson. Corn; its origin, history, uses, and abuses; being the substance of addresses by Robert W. Furnas, delivered before the Cass, Adams, Kearney, Seward, Johnson, and Clay county agricultural societies, Nebraska, 1886. 26pp. Lincoln, Journal-company, State printers, 1886. 59 F98

Brief quotations from early writers on North and South America are used to show the history and origin and importance of corn to the Incas and other American Indians.

146. Gabriel, Ralph Henry. Toilers of land and sea. 340pp. New Haven, Yale university press, 1926. (The Pageant of America; ed. by R. H. Gabriel, v. 3) 135 P14 v. 3

On pp. 30-32, there are four short paragraphs and several illustrations on corn and its culture in colonial days. The following statements are taken from p. 32: "The Indian husbandry was adjusted to the

American environment. If the whites would live, they must use its plants and learn its methods. At Jamestown and at Plymouth the red men taught them how to raise the crops... Three centuries have passed since Squanto carried a knowledge of Indian husbandry to the Pilgrims and yet the basic principles of the red man's maize culture may still be found in the cornfields of America."

147. Gann, Thomas William Francis. Ancient cities and modern tribes: exploration and adventure in Maya lands. 256pp. New York, C. Scribner's sons, 1926. Libr. Cong. F1435.G17

In Ch. IX attention is called to the Indian's love of the soil and of his devotion to his corn plantation. "The making of a milpa - or corn plantation - has become to some extent a religious ceremony, which no inducement one can offer will persuade them to forego. When the first rains of the wet season begin the archeologist will find that his Indian labourers grow uneasy, and depart, one by one, to their milpas; nor will even double or triple wages tempt them back to their work till the milpas are finished."

It is told that during the War of the Castes in 1847 when the Maya Indians rose in rebellion against their Spanish taskmasters two thousand of them camped round Merida, the capital, and it seemed as if they were on the point of recapturing it and their land when, at the psychological moment, the first rains came on rather earlier than usual. Every night a few hundreds of the soldiers would disappear to go back to plant their corn and beans. "And so the cause was lost, Merida was saved, and the yoke of the hated stranger, now probably never again to be cast off, was forged anew around the necks of the aboriginal owners of the soil." The Indian priests ascribed the relief of the city to "the ineradicable millennium-old instinct of the Maya, strong and irresistible as the homing instinct of the pigeon, to turn up at his milpa with the first rains - an instinct stronger than patriotism, more compelling even than hatred."

148. Gann, Thomas William Francis. Discoveries and adventures in Central America. 261pp. London, Duckworth [1928] "First published 1928." Libr. Cong. F1445.G19

Contains a description of progress of an archeological expedition in British Honduras through "low scrubby bush, known as uamil. This is land upon which the Indians have felled the high virgin bush within the last five or six years, and over which a low, thick, scrubby undergrowth, from ten to twenty or thirty feet high, has later sprung up. All round Benque Viejo...is to be found this fringe of uamil, extending for many miles, so that the Indians are compelled to go very long distances in order to find soil covered with virgin bush, and suitable for their corn plantations." Inasmuch as the modern Indians have trouble in raising enough corn for a few thousand people, the author concludes that "the Maya, before the Conquest, must, undoubtedly, either have understood the rotation of crops, or they must have added to the land in the form of fertiliser of some sort those elements which they took out of it in raising a crop of corn." - pp. 39-40.

An explanation is given of a custom amongst the Kekchi which induces them to leave the best paid work to go and make a milpa. "It appears that amongst themselves the Indians will not sell corn to a family with a man in it, only to widows or orphans, or those who are incapable of making milpas of their own. Each man is helped by his neighbours to make his milpa - and, in turn, assists them to make theirs - but a milpa he must make, or go cornless, which to the Kekchi, whose staple article of diet is maize, is equivalent to starvation. This state of things undoubtedly tends to keep up the old communal spirit amongst the Indians, to segregate them from their neighbours, and to perpetuate the ancient religious ceremonies amongst them, as these are nearly all connected with various procedures in the milpa - felling the bush, planting the corn, harvesting, etc. - and are performed primarily with the object of propitiating the gods of rain, fertility, and the winds." - p. 113.

149. Gann, Thomas William Francis, and Thompson, J. Eric. The history of the Maya from the earliest times to the present day. 264pp. New York, C. Scribner's sons, 1931. Libr. Cong. F1435.G175
Bibliography, pp. 255-257.
"It would appear that this Archaic people, highlanders and agriculturalists, flourished between the first and third millennia B.C. upon the mountain plateaux between Mexico and Colombia, where they developed a very characteristic civilization of their own.
"They were, no doubt, the direct descendants of one of the nomadic tribes from Asia, the first American explorers, who had crossed the Behring Straits perhaps 10,000 years before.
"They must have been, however, agriculturalists of no mean order, for to them we owe the cultivation of the maize plant, that staple food of all tropical and subtropical America. It seems probable that maize was developed originally by intensive cultivation from the teosinte (Euchlona mexicana), found throughout the plateau country of Mexico and Guatemala, as this is the only known plant with which maize can be crossed. The gap between teosinte and cultivated maize is, it must be admitted, an exceedingly wide one, and it must have taken many centuries to evolve the one from the other." - pp. 9-10.
"The Maya staff of life was maize, and no meal was complete without it served in some form or other. Maize was usually eaten in the form of griddle cakes, known today under the Spanish name 'tortillas.'" The making and cooking of these are described.
"Maize was also employed in making tamales of meat, beans, or calabash seeds... Maize was also the basis for many drinks, serving as a gruel, or, fermented, as an intoxicant. For long journeys balls of maize paste were made, which, on being mixed with water, supplied a beverage that both quenched thirst and assuaged hunger."

150. Gann, Thomas William Francis. The Maya Indians of Southern Yucatan and Northern British Honduras. Smithsn. Inst. Bur. Amer. Ethnol. Bul. 64, 146pp. Washington, D. C., 1918. 500 Sm63B no. 64
The agriculture of the Mayas is discussed on p. 20, from which the following statement is quoted:

"Of all the arts practiced by the Indian, agriculture is by far the most important; indeed the greater part of his time and labor are devoted to the milpa (kol), or corn plantation, which affords him his principal means of livelihood, for if the corn crop fails he knows that actual starvation will menace his family until the next crop is gathered."

151. Gann, Thomas William Francis. Mexico, from the earliest times to the conquest. 206pp. London, L. Dickson [1936] Libr. Cong. F1219.G184
"First published 1936."
The author speaks of the arrival "possibly some 5000 years ago" of wandering tribes in Central Mexico "after millennia of trekking down the continent...where they found what they must have regarded as an earthly paradise...Successive waves of immigrants arrived in the Mexican valley... Then occurred what was undoubtedly the most momentous event of all time in American history - agriculture was discovered.
"In the highlands of Mexico there flourished a grass known to the Aztecs as teocintli, or sacred maize, and many botanists regard this as the ancestor from which maize, the staple food of American aborigines, from Canada to the Argentine, was developed.
"It is a long step, however, from teocintli to even the most rudimentary form of maize, and many centuries must have elapsed from the time when the first hunter, bringing home an armful of wild grass to his tent, dropped a handful of seeds which, germinating in a few months, saved him the troubles of picking more grass seed, to the harvesting of the maize we know. Maize was the staple food of Mexico and Central America but other food-stuffs, such as beans, pumpkins, and cacao, no doubt developed with it... The introduction of agriculture must, within a short period, have completely altered the whole mode of life of the people. Before this the greater part of their time had been devoted to the acquisition of food by the chase, and gathering wild fruits in the season; but with the coming of maize, sufficient food could be provided in a few months to support the whole population for a year, thus affording them increased leisure to devote to communal organization and the development of such arts as pottery making, weaving, and house construction." - pp. 6-7.
The method of preparation of maize is briefly described on pp. 187-188. "The first drinkers of what is now known as 'corn coffee' were the Maya, from whom the Aztecs acquired the practice."

152. Garcilaso de la Vega, el Inca. Antología de los Comentarios Reales con una introducción critica por D. José de la Riva-Agüero. 565pp. Madrid, M. Aguilar, Editor, 1929. (Biblioteca histórica Iberoamericana, dirigida por Don Carlos Pereyra) Libr. Cong. F3442.G248
Contains selections from the Comentarios Reales of Garcilaso de la Vega in commemoration of the three hundredth anniversary of his death. Describes the preparation and use of maize and maize flour. - pp. 342-345.

153. Garcilaso de la Vega, el Inca. The royal commentaries of Peru, in two parts. The first part. Treating of the original of their Incas or Kings... The second part. Describing the manner by which that new world was conquered by the Spaniards... Written originally in Spanish by the Inca, Garcilasso de la Vega, and rendred into English, by Sir Paul Rycaut, K$^{t}$. 1019pp. London, Printed by Miles Flesher, for Jacob

Tonson at the Judge's-Head in Chancery-Lane near Fleetstreet, 1688. Libr. Cong. Office F3442.G25

Ch. IX, pp. 318-319, is entitled: Of Mayz, Rice, and Other Seeds. Maize is described as the chief grain by which the Indians were sustained before the coming of the Spaniards. It was called maize in Mexico and cara in Peru and was of two sorts, hard or tender. The people of Peru "eat it for bread, either baked or parched over the fire, or boiled in water: the hard mayz is that which they have brought to show in Spain, but not the fine and tender sort." Bread made of maize is said to have been used at their sacrifices and called cancu. Another kind, huminta, was used at feasts. The corn was ground by the women between two stones and not in mortars which required more physical effort. Because of the difficulty of grinding the corn "they did not commonly eat bread." They made a sort of hasty pudding called api of which they are said to have been very fond. In grinding the corn the bran was removed from the flour, the former being used by the Indians and the latter by the Spaniards. The author states that he himself ate no other bread for nine or ten years than that made with maize. The maize flour was used by the Spanish women to make biscuits and fritters as well as food for the sick as the doctors in Peru forbade the use of any bread for the sick except that made from maize.

The flour was also used by the Indians to make vinegar. From the canes before the maize was ripe they made honey and after the canes were ripe they dried them and fed the cattle with them. "Some Indians, who love to be drunk, lay cara steeping in the water, untill it be grown, and then they grind it, and boil it in the same water, and afterwards draw it off, and keep it untill it be stale: This is the strongest drink they have... The Incas forbad it, because it was so violent and strong... All these uses...they have of this cara, besides many others in medicines and physick, and in plasters, as we have mentioned in the other part."

154. Garrison, H. S. Corn. In the Book of rural life, v. 3, pp. 1325-1338. Chicago, Bellows-Durham co. [1925.] 30.1 B64

The first two pages of the discussion are given over to the importance and value of corn.

"Corn is the leading American farm product. Few farmers in the United States let a year go by without raising some corn for grain or for silage or for green fodder. In the great Corn Belt region, cornfields stretch for mile after mile and in late summer give an inspiring picture of the magnitude and wealth of our agriculture...

"The glory of corn as a symbol of American agriculture has long inspired poets and authors, and there are many famous tributes in literature to its greatness...

"Even as it meant life and prosperity to the Indians, so it has come to mean the same to us." - p. 1325.

"Corn played a most important part in the life of the Indians. It was their main seurce of food; it entered largely into their religious and other ceremonies; it encouraged and developed trading between the farming and the hunting tribes; and it developed the community spirit, both in its production and in protecting it from enemies." - p. 1326.

155. Gay, Claude. Historia fisica y política de Chile segun documentos adquiridos en esta republica durante doce años de residencia en ella y publicada bajo los auspicios del supremo gobierno. 28v. Paris, En casa del autor; Chile, en el Museo de historia natural de Santiago, 1844-71. Libr. Cong. F3058.G27

Two volumes deal with agriculture in the second of which is a section on maize, its American origin, its cultivation in Chile and its use as food and feed.

156. Gilmore, Melvin Randolph. Indian lore and Indian gardens. 39pp. Ithaca, N. Y., Published under the auspices of The Coordinating council on nature activities by The Slingerland-Comstock co. [1930] Libr. Cong. E.98.A3G48

On pp. 14-15 the writer shows "how important a part of the Indian fare was the one item of corn" and states that "by archaeological remains of great age we find that corn was already perfectly stabilized in all the five types which we now know, and in high quality, many centuries before America had ever been seen by a white man."

"No doubt Indian corn was the one most useful food plant possessed by the native people of both North America and South America." - p. 23. Following this statement the writer tells of various ways of using and cooking corn for food, pp. 23-26.

157. Gilmore, Melvin Randolph. The Missouri River and the Indians. Geogr. Soc. Philadelphia. Bul. 25(4): 155-161. Oct. 1927. Libr. Cong. G3.G34

"The cultivation of corn was very closely and intimately interwoven into all the national life and thought of all the different Indian nations which practised agriculture, especially of the Arikara and Pawnee, who had brought it northward with them in their migration into this region from its original habitat in the tropical region. They looked upon corn as a divine gift, and they paid it becoming veneration in beautiful and rich ritualistic ceremonies, replete with imagery and symbolism. In these religious ceremonies corn was revered and honored and spoken of by the endearing, and at the same time highly respectful title of 'Mother Corn.'" - p. 19.

158. Gilmore, Melvin Randolph. Uses of plants by the Indians of the Missouri River Region. Smithsn. Inst. Bur. Amer. Ethnol. Ann. Rpt. (1911/12)33: 43-154. Washington, D. C., 1919. 500 Sm63 v. 33

Reprinted by Government Printing Office in separate form, 1919. (452.8 G42)

Bibliography, pp. 153-154.

In his toxonomic list of plants, there is a section on maize, pp. 67-68, from which the following is quoted:

"Maize was cultivated by all the tribes of Nebraska. Native informants say they had all the general types - dent corn, flint corn, flour corn, sweet corn, pop corn; and that of most of these types they had several varieties. They maintained the purity of these varieties from generation to generation by selecting typical ears for seed and by planting varieties at some distance from each other. They raised

considerable quantities, part of which was preserved by drying in the green stage, while the rest was allowed to ripen... Maize comprised a large part of the food supply. Corn was regarded as 'mother' among the Nebraska tribes who cultivated it...

"Corn silks were gathered and, after being dried in the sun, were stored away for use as food. To this end the dried corn silks were ground with parched corn, and, it is said, gave sweetness to the compound.

"Our European race little appreciates the great number and variety of corn food products made by the American tribes. No attempt is here made even to give a full list of such products."

159. Granado, José T. del. Plantas bolivianas. 284pp. La Paz, Arnó Hermanos, 1931. 457.4 G76

The utility and importance of maize are briefly noted on pp. 117-118. It is said to be the sole food of the natives of the valleys and plateaus of Bolivia.

160. Gray, Lewis Cecil. History of agriculture in the southern United States to 1860 by Lewis Cecil Gray, assisted by Esther Katherine Thompson. With an introductory note by Henry Charles Taylor. 2v. Washington, Carnegie institution of Washington, 1933. (Carnegie Institution of Washington. Publication no. 430) 30.9 G71

Bibliographical introduction, pp. 945-951; list of works cited, pp. 951-1016.

Numerous references to corn are given in the index. Among the items of interest in volume I are those noted below.

The widespread use of maize as the principal bread grain of the natives from Canada to Brazil and through out the West Indies shows its economic importance. The plant was utilized in various ways by the natives and the early colonists adopted most of their methods of use. - p. 3.

Maize "was the principal source of food for De Soto's expedition and for the various French explorers and traders." - p. 6.

After six weeks of trading, John Smith obtained 279 bushels of maize from the Indians in the fall of 1608 which tided the colonists through their second winter in Virginia. - p. 17.

In 1616 corn was so abundant in the Virginia colony "that the former dependence on the natives was reversed, and the Indians were buying from the colonists." - p. 21.

"...by reason of its peculiar advantages under the conditions of a pioneer economy in a wooded region, maize early became the principal bread grain of the [Virginia] Colony, as it was destined to be in the South as a whole." - p. 27.

In the beginning maize was the principal bread grain in the Maryland colony. Soon after settlement a thousand bushels obtained from the Indians was shipped to New England in exchange for salt, fish, and other products. Because of the early adoption of the policy of compelling the planting of an adequate supply of corn this colony was

never in serious danger of starvation. Because of scarcity in 1647 and 1652 the exportation of maize was prohibited. - pp. 36-37.

Le Moyne d'Iberville, who established a settlement at Biloxi, compelled the soldiers left there when he went to France for supplies, to plant beans and maize. - p. 62.

"The cultivation of maize was begun in the first years of the [Louisiana] colony... In 1776 Bouligny asserted that were the crops of maize to fail the greater part of the negroes would perish, 'as they are accustomed to this food and prefer it to the best bread'... its use was general among the rich, as well as among the poor." There was considerable domestic trade in it and small surpluses were shipped to the West Indies and were used in rationing ships, but its quick deterioration in the semi-tropical climate "did not favor regular export trade." - p. 67.

In the Georgia colony "during the last few years of the colonial period small quantities of maize and peas were exported to the West Indies. The Colony's margin of both crops was so small that in years of scarcity, such as 1766 and 1770, it was found necessary to prohibit exportation...Maize and rice were so abundant and so commonly employed that there was no widespread demand for wheat flour." - p. 103.

Ch. VII, pp. 161-176, is on the Grain Crops of the colonial period. The exportation of corn was forbidden in both Virginia and Maryland colonies in times of shortage. Prices were fixed and engrossing was prohibited in 1647 in the Virginia colony. - p. 163. There was a tendency amont "tobacco planters to sell their 'exhausted' lands to new settlers for the production of corn and wheat." - p. 168. The production of Indian corn, foreign trade, varieties and methods of production are dealt with on pp. 171-174. The following is quoted from p. 171: "Whereas the cultivation of the small grain crops was so sporadic and occasional before the settlement of the back country, Indian corn was universally known from the earliest period of settlement. The taste acquired for it in the various forms in which it was prepared no less than its great economic advantages made it the staff of life for high and low alike. According to Marc Catesby, who obtained his information from Colonel William Byrd, certain Virginia slaves who by reason of the temporary scarcity of Indian corn were compelled to eat wheat 'found themselves so weak that they begged of their Master to allow them Indian Corn again, or they could not work.' Indian corn was also the principal grain fed to livestock."

161. Gregory, Clifford V. Farming through the ages. Prairie Farmer 101(3, 4, 13), 73, 77, 113, 119, 139, 505, 511. Jan. 19, 26, Mar. 30, 1929. 6 P883

These are three of a long series of articles, on Farming Through the Ages.

The first article, The First Farmers of America, pays tribute to the Indian gift of corn and potatoes to American agriculture, "without which the story of farming in America could not be told." Columbus "was hunting for the spices of the Orient; he found a plant that has been of greater value to the human race than all the spices of the world... Today the corn belt of America ships food into every corner of the world.

Corn is the basis of its farming. Its great cities are almost literally builded on foundations of corn. That is part of the debt that agriculture owes to the Indians." - p. 77.

The second article in the series, The Story of Indian Corn, describes the gradual spread of the maize plant northward with the tribes who migrated to escape barbarian invasions.

"It is a far cry from Chitzen-Itza, the great city of the Mayas, to Chicago. Yet to corn both owe their greatness. Without this wonderful crop neither could have grown much beyond a frontier trading post." - p. 119.

"The glory of Maya is but a memory, but it gave us corn, a greater heritage than the sculpture of Greece or the laws of Rome." - p. 139.

The third article, Colonial Farming in America, describes the attempts of the colonists to grow various new and old crops and develop trade with England.

162. Gregory, Herbert Ernest, Keller, Albert Galloway, and Bishop, Avard Longley. Physical and commercial geography; a study of certain controlling conditions of commerce. 469pp. Boston, New York [etc.] Ginn and co. [1910, i.e. 1920?] 278 G86

This book is in three parts. Pt. III is entitled Geography of Trade. Maize is discussed on pp. 255-257 of Pt. III. The following extracts are quoted from this section: "But no country has, as yet, surpassed the United States in its production, nor, since its extensive cultivation in the United States following the early settlements, has any country been our serious rival... In some lands, such as Mexico, Central America, Italy, and Egypt, maize is still used as the national food... At the present day corn easily leads as our most valuable crop, as also in acreage and quantity produced... Although corn can be grown in many countries, its extensive cultivation is confined, at present, almost entirely to the United States, which yields four fifths of the world's crop. Argentina, Mexico, and the countries of southern Europe are the other largest producers. It is from Argentina that we may look for the greatest future foreign development in the production of maize. Some even anticipate that, in the not distant future, Argentina will surpass the United States in yearly output."

A diagram on p. 257 shows the production of corn in the United States, 1850-1916.

163. Grinnell, George Bird. The Cheyenne Indians, their history and ways of life. 2v. New Haven, Yale university press [etc.] 1923.
Libr. Cong. E99.C53G77

These volumes contain a number of references to the origin of, beliefs concerning, the planting and cultivating, and legends of the Cheyennes regarding corn. See particularly pp. 251-254 of Volume I.

The following is quoted from p. 91 of volume II (chapter on their religious beliefs): "Heannawihio [the principal god who lives up above] showed them the corn, and told them to plant, and cultivate, and eat it, saying that after a long time all people would learn to plant and raise grain, and to grow other things for their subsistence. On the other side of the big water, he said, a different people were living,

and a day would come when these people would cross over to this side of that water, and they would see them. A time would come when there would be wars, and many people would be killed."

164. Grisdale, J. H. Corn: its history, production and utilization - the European corn borer. Agr. Gazette Canada 9(2): 83-86. Mar.-Apr. 1922. 7 C16G

The first part of this article tells of the discovery of corn by Columbus and its ultimate adoption for cultivation by all the settlers in North America who came to value it highly, just as the Indians had. Corn was the great staple food, and to the present time remains the most valuable crop of America.

165. Haas, William H. The cliff-dweller and his habitat. Assoc. Amer. Geogr. Ann. 16(4): 167-215. Dec. 1926. Libr. Cong. G3.A7

The importance of corn to the cliff-dwellers of the Southwest is discussed on pp. 177-178. "To make living conditions more favorable, or even possible, in the arid Southwest the Indian was fortunate in the possession of one of mankind's most valuable plants, that of maize... its history has been a part of the earliest history of American Indian development, and the cereal most properly is called Indian corn." - p.176.

166. Harriot, Thomas. A briefe and true report of the new found land of Virginia, by Thomas Hariot. Reproduced in facsimile from the first edition of 1588. With an introductory note by Luther S. Livingston. unpaged. New York, Dodd, & co., 1903. (Dodd, Mead & Company's Facsimile reprints of rare books. Historical series, no. I) Libr. Cong. F229.H285

Includes a description of maize and its uses. "Pagatour, a kinde of graine so called by the inhabitants; the same in the West Indies is called mayze: English men call it Guinney wheate or Turkie wheate, according to the names of the countries from whence the like hath beene brought."

167. Harrington, M. R. Some Seneca corn-foods and their preparation. Amer. Anthrop.(n.s.)10(4): 575-590. Oct.-Dec. 1908. Libr. Cong. GN1.A5

As its title indicates this article contains detailed descriptions of the preparation of corn for food among the Senecas, but an introductory paragraph is of interest in showing proof of the utilization and distribution of corn.

"Our earliest evidence of the use of corn among the Iroquois, of whom the Seneca form a part, is found on their ancient village sites, occupied before the white man came; and consists of abundant charred corn, with occasional cobs, husks, and stalks, found in ash-pits and other places favorable to their preservation. Then we have the historical accounts from the early missionaries, traders, and soldiers who passed thru the Iroquois territory; and finally, the work of modern students." - p. 575.

168. Harshberger, John William. Maize, a botanical and economic study. Pa. Univ. Bot. Lab. Contrib. 1(2): 75-202. Philadelphia, 1893. 451 P38 v. 1; 59 H25M

This is a comprehensive study in eight chapters, which deals with the origin and history of the maize plant, its cultivation and use by the Mayas, Incas, North American tribes, colonists and by American agriculturists.

The writer states on p. 151 that "The evidence of archeology, history, ethnology and philology, which points to central and southern Mexico as the original home of maize is supported by botany and meteorology.

"Maize, the greatest arable crop which we grow, occupying the largest portion of our cultivated area, has never been known to fail. It is destined to occupy, in America, the place that rice fills in India, China and Japan, that cassava fills in South America, and that sago occupies in Borneo, Java and the Indian Archipelago - the staple food of man." - p. 200.

169. Harshberger, John William. Phytogeographic influences in the arts and industries of the American aborigines. Geog. Soc. Phila. Bul. 4(3): 25-41. Apr. 1906. Libr. Cong. G3.G34

A page and a half of this discussion are devoted to maize about which the author writes:

"Of all the plants cultivated or wild that were utilized by the desert tribes of Indians, corn, or maize, was of most importance, for it was used for food, fuel, dress, ornament, and in nearly all of their religious ceremonies in some form or other. Its importance as a plant to the aboriginal husbandman was fully recognized, and the state of cultural development of the Pueblos was largely the result of the cultivation and dependence upon this one plant." - p. 38.

170. Hartley, C. P. Maize-growing. In Bailey, L. H., ed. Cyclopedia of American agriculture, v. 2 - Crops, pp. 402-418. New York, London, The Macmillan co., 1907. 30.1 B15C

For the history and the place of corn in American agriculture see pp. 404-406.

171. Hathway, Frederick Richmond. The relation of corn to our national history... Published for the purpose of arousing wide interest in the necessity ef taking active measures to combat the ravages of the corn-borer by Union trust company, Detroit, Michigan. [21]pp. Royal Oak, Mich., 1927. Pam. Coll. 59 H

In this account of the beginning, spread and importance of corn culture among the American people from Puritan times to the present, the author elaborates on the many uses of corn. The colonists as well as the pioneers depended upon it for food for themselves, their cattle and barnyard fowls, and they used the husks in their mattresses, and the stalks fer fodder. As settlements moved westward, corn growing was expanded and new uses for the product were found. The pioneers soon discovered how to make corn whiskey to replace their accustomed rum, and the country taverns where such corn whiskey was sold became gathering places er social clubs for the entire neighborhood. Not only local

affairs, but presidential campaigns such as Jackson's and Tyler's were thrashed out and possibly decided in these many country stores and taverns. During the Civil War, parched corn was generally used as a substitute for coffee, both in the homes and by the Confederate troops, and even "in recent years parched corn has been used extensively as the basis for foods and drinks for people with weak stomachs and shattered nerves." Innumerable products, such as sirup and salad oil, which are universally used in modern America are manufactured from corn.

The following paragraph appears on p. [20]: "Thus it will be seen that the corn crop is not only the first crop in volume and value but that its production is intimately associated with the life of the nation. From the winter that the Pilgrims landed at Plymouth Rock to the present time the silken corn thread has run through the entire yarn from which the tapestry of American History has been woven. Personally I hate to consider what pictures that tapestry will disclose if this thread is destroyed."

172. Havard, Valery. Drink plants of the North American Indians. Torrey Bot. Club. Bul. 23(2): 33-46. Feb. 29, 1896. 451 T63B

"All authorities substantially agree that American Indians, North of Mexico had not acquired knowledge of preparing alcoholic drinks at the time of the landing of Columbus." - p. 33.

The writer says however, that the Indians of Mexico and further south, did make stimulating and alcoholic drinks from corn, and from Maguey which produced pulque, the national drink of Mexico.

"According to Oviedo and Von Humboldt, maize was used in the religious rites of both Mexicans and Peruvians, and sugar procured from it, as well as a vinous liquor called chicha, 'drunkenness having already become frequent under the Aztec dynasty.' How much of this drunkenness is attributable to chicha and how much to pulque would be difficult to determine. It is probable enough that both beverages were important factors in the demoralization and degeneration of the Aztecs which enabled Cortez, with a handful of men, to conquer the whole empire of Montezuma...

"Considering the abundance of corn among our Indians, and their craving for all intoxicants, it seems almost incomprehensible that the primitive and very simple art of making corn beer should never have found its way north of the Rio Grande." - pp. 34-35.

173. Havard, Valery. Food plants of the North American Indians. Torrey Bot. Club. Bul. 22(3): 98-123. Mar. 27, 1895. 451 T63B

Contains a paragraph, p. 99, on maize. This states that maize was probably indigenous to the southern highlands of Mexico; that the plant received special care and many varieties were developed by the Mayas, Nahuas and Aztecs; that the Aztecs began to cultivate it in 666 A.D.; that it reached the eastern states in the year 1000 and was "the principal and most common crop of all agricultural Indians" at that time; and gives E. L. Sturtevant's opinion on the species grown.

174. Hawk, Emory Quinter. Economic history of the South. 557pp. New York, Prentice-Hall, inc., 1934. (Prentice-Hall history series, Carl Wittke, ed.) 277.002 H31

In two paragraphs on pp. 266-267 the writer brings out the peculiar identity of corn with the whole development of the ante-bellum South and that it was cultivated in every community, fed to the domestic animals, and was an important element of the diet of both white and black. Another paragraph on p. 470 is on the importance of corn in the South after 1880.

175. Hedrick, Ulysses Prentiss. A history of agriculture in the state of New York. 462pp. [Albany, N. Y.] Printed for the New York state agricultural society, 1933. 30.9 H35

In his chapter on Indian Agriculture, pp. 20-39, the author states that the most important of the Indian crops and the staple article of food was corn, and that it was produced in considerable quantities and stored away for times of famine and need. He describes the methods by which it was prepared for food by the Indians and later on by the whites who adopted most of the Indian cooking modes as well as the manner of planting, of culture, and of harvesting. The following is quoted from the chapter on Farm Crops:

"In the new settlements of New York, corn was much the best cereal crop for the rude conditions of the settler's clearings. Its seeds could be planted with little or no preceding preparation of the soil and the crop grew with subsequent care to produce an abundant harvest. Corn was more certain to yield reasonably than any other food-giving crop the settlers might plant. Moreover, it could be harvested over a period of a month or more while other grains had to be garnered in a few days at a precise time. It could be utilized as a human food with less trouble than any other grain. Thus, corn was the crop of crops for the pioneer. It literally fed the people of New York during the time they were creating farms from the forest. The conquest of the new lands of the State and of the continent would have been much slower had it not been for this admirable esculent which the Indians put in the possession of the whites." - p. 335.

176. Heller, Karl Bartholomaeus. Maize in Mexico. U. S. Patent Off. Rpt. 1847: 411-413. Washington, 1848. (30th Cong., 1st Sess. House Doc. 54) 1 Ag89 1847

"From the Vienna Zeitung - by H. Carl Heller. Translated by E. Goodrich Smith of the Patent Office."

From his Reisen in Mexiko in den Jahren 1845-1847, pp. 389-394.

The writer includes in this article an enumeration of the uses to which corn was put by the ancient Incas and the Mexicans to show "the value of this plant to the inhabitants of Mexico."

177. Helmrich, Gustavo. El cultivo del maíz en el norte de Guatemala. La Hacienda 5(6-9, 11): 171-174, 217-218, 232-233, 278-280, 328-330. Mar.-June, Aug. 1910. 6 H11

This is a study of maize cultivation in Northern Guatemala and its economic importance. It is said to form the basic food of the working

population and to govern the monetary situation inasmuch as prices of other necessities rise or fall in accordance with the maize harvest. Its use for the raising of hogs and poultry by workers on coffee plantations is evaluated.

178. Hen-toh, Wyandot. Mon-dah-min, and the red man's world old uses of Indian corn as food. Jour. Home Econ. 10(10): 444-451. Oct. 1918. 321.8 J82

"That America taught the world the use of it [corn] is an undisputed fact; that it is the one most useful, popular, and productive cereal is as true. One cannot help but wonder that if, when Columbus discovered corn in the Western world, and carried it back to Spain, instead of the wealth of gold that so many of the early discoverers hoped to find and carry back with them, he ever dreamed of the benefit he was bringing to the future generations of his world, and of the wealth of gold that would be acquired by the knowledge and cultivation of the grain which he had found by the so-called savages of America." - p. 444.

The writer states that the significance of corn to the Redman is evidenced by its place in their legends and folklore; and that its popularity is shown by the many different ways in which all of the various tribes prepared it for food. Most of the article is given over to a recital of the legend of the origin of corn and to a description of Indian cookery methods and recipes.

179. Hewett, Edgar Lee. Ancient life in Mexico and Central America. 364pp. Indianapolis, New York, Bobbs-Merrill co. [1936] Libr. Cong. F1219.H58

Part 5, Intellectual, Esthetic, and Spiritual Attainments, contains a discussion on the development and value of Indian corn. "The latter constitutes one of the most stupendous of agricultural resources today, and its development into a food plant is attributed by some anthropologists to the wisdom of the Indians... From it [teosinte] the Indian is alleged to have bred the edible cereal that meant so much by way of sustenance to his race, and has come to mean a priceless food supply and billions in money to the white man." - p. 228.

"So, concerning the natural history of our priceless American cereal, you may take your choice between giving nature credit for it, or creating an aboriginal Burbank to wizard an inedible, cobless grass seed into the succulent cereal that has given to humanity (American humanity at least; Europe is still a bit benighted in this respect) the tortilla of Mexico, the hominy, succotash, and corn pone of the United States. The abundant life exemplified in corn-fed American manhood and womanhood, the saving of the English colonists from starvation, the raising of wild, western valley and plains land to five hundred dollars an acre, incidentally through juxtaposition of corn, hog, and steer, creating such an oversupply of food as to give economic indigestion and political panic to a great nation, are mighty results that have followed the evolution of that insignificant plant that came to be called Indian corn." - p. 232.

180. Hewett, Edgar Lee. Ancient life in the American southwest; with an introduction on the general history of the American race. 392pp. Indianapolis, Bobbs-Merrill co. [1930] Libr. Cong. E78.S7H5

Ch. II, Time Factors and Evolution Factors, contains the following regarding maize: "Corn developed with primitive cultivation wherever it was indigenous, probably from some ancestral grass, and gradually spread over the continent along with man who was finding it a most satisfactory article of food. He found his corn improving as did all the rest of his natural food plants with his crude care. That the development of this plant was a prominent factor in the evolution of the culture of the American race can not be doubted, but the biological history of corn is as yet an unsettled problem... As the development of metal gave direction to the culture of the European race, laid upon it a destiny of mechanical industrialism, control of natural forces, self-sufficiency, vast material advantages, and potentiality for self-destruction, so corn helped to shape the destiny of the American race toward agrarian life, dependence upon nature, submission to powers outside of self, and a spiritual and esthetic culture, with marked slowness to adapt to changes in environment. However, it should be understood that corn was a variable factor in shaping aboriginal culture, in some groups dominant, in others negligible, depending largely upon specific environmental conditions." - pp. 35-36.

181. Hibbard, Benjamin Horace. Indian agriculture in southern Wisconsin. Wis. State Hist. Soc. Proc. (1904) 52: 145-155. Madison, 1905. 138 W75P v. 52

That the Indians were sedentary rather than nomadic, and that they cultivated and produced great quantities of corn and other products in many parts of Wisconsin is the author's thesis. The following is quoted from p. 155:

"Thus it is seen that the Indians, on their own account, furnished provisions for their own war parties; for the English forays against Americans and Spanish; for explorers like Marquette, Carver, Lewis and Clark, and the long list of later adventurers who came to spy out the land and eventually to expel the tribesmen from their fields. The traders who ranged the woods and rivers for a century before civilization ruined their traffic, depended in a large measure on the meagre stores of Indian corn and beans; while even the troops which finally hunted the natives from their homes, filled their camp kettles either from the caches or the corn fields of the fugitives. Nor was this all. The earliest settlers seized upon little cultivated plots as the most desirable ground for their first plantings, and utilized the native-grown seed, since it was known to be adapted to the soil and climate."

182. Hill, W. W. The agricultural and hunting methods of the Navaho Indians. 194pp. New Haven, Yale university press; London, H. Milford, Oxford university press, 1938. (Yale University Publications in Anthropology No. 18) 31.3 H552

Bibliography, pp. 191-193.

Agriculture is dealt with on pp. 20-51. Methods of planting, harvesting and storage of corn and other plants and their utilization

are brought out, among other things. Corn was used for food - while green it was boiled, roasted, and made into soup or bread. The mature corn was used in many ways. Corn cobs were ground and used for flour in time of famine. "Smut from corn was gathered, boiled and eaten."

"All methods of the corn growing complex were transferred to the cultivation of wheat." - p. 50.

The agricultural ritual pertaining to agriculture, particularly corn, is discussed on pp. 52-95.

"The attitude toward agriculture and especially toward corn was one of veneration... Aside from this feeling of veneration there appears to have been a genuine religious exhilaration associated with corn and its cultivation." - p. 53.

183. Hinsdale, Wilbert B. The first people of Michigan. 178pp. Ann Arbor, George Wahr [1930.] Libr. Cong. E78.M6H59

"The chapter on Indian Corn Culture in Michigan has been revised from papers published in the reports of The Michigan Academy of Sciences, vol. 8, 1927." - Preface.

Ch. 10, pp. 142-167, is devoted to Indian corn culture in Michigan, and describes the locations of many fields of corn-hills still discernable in those parts of the state formerly occupied by the Indians. Corn was their staple food, and the crop was stored in pits or cribs for future use. The methods of cultivation and cookery are briefly described, and also the general agricultural practices.

184. Hinsdale, Wilbert B. Indian corn culture in Michigan. Mich. Acad. Sci., Arts and Letters. Papers (1927) 8: 31-49. New York, Macmillan co., 1928. 500 M582 v. 8

The many evidences of corn culture in various parts of Michigan are presented to show the universality of its production among the aborigines. The remains of corn fields and of storage pits and cribs are testimony of the importance of the plant.

On p. 41 the writer states: "Probably no plant had a wider distribution upon the continent than corn. This is certainly true of domesticated plants. Nearly all the tribes in the territory now called United States, with the possible exception of some of those living west of the Rocky Mountains, cultivated it more or less, and more consumed corn than raised it, because non-producers are known to have procured it by trade."

"After centuries of unconscious selection, the Indians had developed varieties of corn with wonderful adaptation to the climatic condition in which they were grown. In the southwest among the Pueblos there were drought-resisting kinds. In the north, where the seasons were short, there were varieties that matured early after planting. There were kinds that would do well in the half-shade of open woods." - p. 43.

"The entire technique of the Indian woman's corn culture has been taken over by the white planters; the method of planting in hills or drills, hoeing or weeding, husking, storing in cribs, milling and the conversion of the shelled grain into mush, hominy, cakes, 'green corn' and ingredients of breads and broths." - p. 49.

185. Hinsdale, Wilbert B. The Indians of Washtenaw County, Michigan. 68pp. Ann Arbor, Mich., George Wahr [1927] Libr. Cong. E78.M6H6

Contains brief references to corn under the heading Food, and also in a section on our debt to the Indian. Every village had its cornfield, and the Indian women were successful cultivators. On p. 36 the writer writes: "How could the agriculture of the country be carried on without corn, for example? Nothing was known of this cereal before the Discovery, but it has become almost the foundation of agriculture in many states. That of it which we do not eat ourselves comes to us indirectly through the medium of our domestic animals."

186. Hodge, Frederick Webb, ed. Handbook of American Indians, north of Mexico. Smithsn. Inst. Bur. Amer. Ethnol. Bul. 30, 2v. Washington, D. C., 1907-1910. 500 Sm63B no. 30

There are two articles of interest to this bibliography in volume 1 of this Handbook, one on Agriculture and one on Maize.

Agriculture, by Cyrus Thomas, pp. 24-27. The writer emphasizes the fact that the Indians of the temperate regions were not nomads, but dwelt in settled villages and cultivated the soil, and that maize was one of their important products.

"The great length of the period previous to the discovery during which maize had been in cultivation is proved by its differentiation into varieties, of which there were four in Virginia; by the fact that charred corn and impressions of corn on burnt clay have been found in the mounds and in the ruins of prehistoric pueblos in the S. W.; by the Delaware tradition (see Walam Olum); and by the fact that the builders of the oldest mounds must have been tillers of the soil.

"If we are indebted to the Indians for maize, without which the peopling of America would probably have been delayed for a century, it is also from them that the whites learned the methods of planting, storing, and using it. The ordinary corncribs, set on posts, are copies of those in use among the Indians, which Lawson described in 1701." - p. 25.

Maize, pp. 790-791, was also written by Cyrus Thomas and contains material similar to that already noted above. The writer brings out the idea that maize was an important agricultural product among nearly all the Indian tribes with whom the early explorers, voyageurs and settlers come into contact. Cartier, Champlain, Hennepin, Marquette, La Salle, Joliet, Coronado, Hariot and others speak in their narratives of finding the fields and storehouses of maize, and of how it formed the staple food supply for the various Indian tribes.

187. Hodge, Frederick Webb. Story of our metate; a chronicle of corn. Brooklyn Inst. Arts and Sci. Bot. Gard. Rec. 18(6): 283-307. Nov. 1929. 451 B79R

Guide no. 3 of the Brooklyn Botanic Garden.

The gift of an Ancient Pueblo metate to the Brooklyn Botanic Garden is the occasion for telling this story of corn and its importance in Indian history and industry.

With the introduction of corn culture among the Indians of the Southwest, a primitive agriculture developed and a sedentary life became

necessary. "This gave rise both to dwellings of a more permanent character and to the need of storage of the crops, meager though they must have been at first. As the food supply increased, the population was augmented, for people of a roving nature realizing the benison that corn proved to be, settled down to farm life like the others. Later on, rude pottery was invented... Progress continued through the generations. The food quest no longer meant such a precarious existence, for Chief Maize had led the way... Then there was greater concentration of population in certain areas, greater architectural and ceramic achievement.

"Let this suffice to show the influence of corn on a lowly people from the time of its introduction until the Spaniards made their appearance in the Southwest near the middle of the 16th century. Before they knew corn they were probably not unlike the Indians of the Nevada deserts existing on anything they found edible, huddling from winter gales beneath brush structures unworthy the name of dwellings, producing little or nothing in the way of art. But the Basket-makers, once familiar with corn, were augmented by newcomers until in course of time a true Pueblo culture was developed, characterized by elaborate rites, ceremonies, religious and fraternal organizations, a mythology of high ingenuity, agriculture with irrigation requiring engineering skill, houses and ceremonial chambers sometimes of daring construction, and a social system of marvelous intricacy and tribal beneficence. All this is what corn made possible to the most highly advanced Indians within our domain." - pp. 288-290.

"Then maize was introduced, and, behold, a new era dawned! Agriculture largely superseded the gathering of wild products, vegetal and animal; dwellings more or less permanent were grouped in defensive villages, for to wilder tribes who preferred to follow the lives of huntsmen and raiders it became easy to make forays against their weaker neighbors and loot the hard-earned product of their toil. Therefore corn played an important part not alone in changing the mode of life of sedentary peoples, but it afforded the chief incentive of stronger tribes to carry on their depredations." - p. 290.

"All Indians hunted game to a greater or lesser extent; but corn became the great staple of the village-dwellers. Indeed so dependent on it were they that they developed what may be called a corn cult, with various sacred personages embodying the corn principle, such as Mother Corn and Mother Earth; and many rites and ceremonies were performed and sacrifices made for the increase of the life-preserving grain." - p. 293.

"It is not difficult to see, then, what influence the cultivation of corn wielded in the economic life of such a people, how it affected their religion and mythology, and even their social organization as shown by numerous clans which take their names from maize." - p. 295.

188. Holmes, George K. Aboriginal agriculture - the American Indians. In Cyclopedia of American agriculture, ed. by L. H. Bailey, ed. 4, v. 4, pp. 24-39. New York, London, The Macmillan co., 1912. 30.1 B15C

The writer repeatedly points out that corn was the chief cultivated food plant of the Indians and that they relied on it for their principal subsistence. The many reports of the early explorers referring to the cultivation of corn by Indian tribes throughout the suitable latitudes of the United States indicate the importance of the cereal.

189. Holmes, W. H. Handbook of aboriginal American antiquities. Part I, Introductory, the lithic industries. Smithsn. Inst. Bur. Amer. Ethnol. Bul. 60, Pt. I, 380pp. Washington, D. C., 1919. 500 Sm63B no. 60, pt. I

The author devotes a paragraph to the agriculture of the Incas of the Middle Andean-Pacific area, pp. 137-138, in which he states:

"Agriculture was by far the most important industry of the area and a chief concern of the Inca rulers. It was practiced originally in many centers, separated more or less completely by natural barriers, but later all sections were unified by the Inca, who employed every known device and took every step calculated to increase productiveness... Maize was the chief product, and the many varieties found and perpetuated even to the present time afford evidence of independent development covering a long period of time."

190. Hoover, J. W. Anthropogeography of the Southwest: some recent contributions. Geogr. Rev. 30(2): 317-319. Apr. 1940. 500 Am35G

The following paragraphs are quoted from this article reviewing several recent publications on Indians of the Southwest:

"As to the reason for the development of this most complicated Indian civilization, 'the answer is corn.' Corn was the first plant of the western hemisphere to be artificially adapted to man's use as a dependable source of food, and the best possible cereal to serve man on a continent that had no draft animals. In a region with most of its area better suited to produce forage than anything else there was a complete absence of anything akin to pastoralism until the Spanish introduction of sheep. The people of the plateaus became farmers of corn and squash and developed a culture that has been termed a maize-squash complex.

"The reluctance of the Pueblos to adopt new techniques is explained by the close tie-up of the mores and ceremonial life with the material culture. The smallest change may lead to another that finally undermines an entire system. 'When the Corn Maiden no longer grinds, the youth no longer plays to her on the flute. When the Corn Mother is not the chief food, there is an end of that intricate system by which trays of cornmeal are interchanged as gifts.' The interlocking of all the parts that go to make the structure of their old civilization may be disrupted. Hence the Pueblos change slowly behind their wall of secrecy, but they have always changed, as every people does."

191. Hough, Walter. The Hopi Indians. 261pp. Cedar Rapids, Iowa, Torch press, 1915. (Little histories of North American Indians, no. 4) Libr. Cong. E99.H7H76

The planting and cultivation, harvesting and storing, and food uses and cooking of maize by the Hopi are described in the chapter on Food and Rearing, pp. 49-68.

The grinding into meal, and bread baking as well as the roasting of green corn and the feasting that went with it held an important place in the life of the tribe. "Surely corn is the 'mother' of the Hopi. All the powers of nature are invoked to grant a good crop by giving rain and fertility, and the desire for corn is the central motive of the numerous ceremonies of the villagers of Tusayan. If the prayers of the Hopi could be formulated like the 'Om mane padme hum' of the Hindus, it would be in the smaller compass of these words, 'Grant us corn!'" - p. 64.

"With corn which possesses a high food value and is easily raised, stored, and preserved, the Hopi and their Pueblo brethren spread without fear throughout the semi-arid lands." - p. 65.

"The vocabulary of corn in the Hopi language is extensive and contains words descriptive even of the parts of the plant that are lacking to most civilized people. The importance of corn is also reflected in the numerous words describing the kinds of meal, the dishes made from corn or into which corn enters, and of the various ways in which it is prepared by fire for the consumption of the ever-hungary Hopi." - p. 66.

192. Houghton, Louise Seymour. Our debt to the red man; the French - Indians in the development of the United States. 210pp. Boston, Stratford co., 1918. Libr. Cong. E99.M693H8

A spirited defense of Indian civilization, including references to corn and other food products given to the white men by the red. The dependence of the colonists upon maize which saved them from starvation, and the Indians' help in establishing corn fields for the settlers is brought out.

193. Hulbert, Winifred. Indian Americans. 161pp. New York, Friendship press [1932] Libr. Cong. E77.H92

"The third gift of the Indian is the development by his ancestors of certain now universal food stuffs... For countless generations corn has been the most important food of their race; around its culture their religion itself was built involving ceremonies for invoking rain, planting the seed, beseeching fruition, harvesting the ripened ears, even for grinding of the kernels into meal." - p. 13.

194. Humboldt, Alexander, Freiherr von. Political essay on the Kingdom of New Spain. Tr. from the original French by John Black. 2v. New York, I. Riley, 1811. Libr. Cong. F1211.H921

In Vol. II, book IV, Ch. IX, we find an account of the vegetable production of the Mexican territory. "Maize occupies the same region as the banana and the manioc; but its cultivation is still more important and more extensive... Advancing towards the central table-land we meet with fields of maize all the way from the coast to the Valley of Toluca, which is more than 2,800 metres above the level of the ocean. The year in which the maize harvest fails is a year of famine and misery for the inhabitants of Mexico.

"It is no longer doubted among botanists that maize, or Turkey corn, is a true American grain, and that the old continent received it from the new...

"On the discovery of America by the Europeans, the zea maize (tlaolli in the Aztec language, mahiz in the Haitian, and cara in the Quichua) was cultivated from the most southern part of Chili to Pennsylvania. According to a tradition of the Aztec people, the Toultecs, in the 7th century of our aera, were the first who introduced into Mexico the cultivation of maize, cotton, and pimento. It might happen, however, that these different branches of agriculture existed before the Toultecs, and that this nation, the great civilization of which has been celebrated by all the historians, merely extended them successfully. Hernandez informs us that the Otamites even, who were only a wandering and barbarous people, planted maize. The cultivation of this grain consequently extended beyond the Rio Grande de Santiago, formerly called Tolotlan... The maize...of all the grains useful to man, is the one whose farinaceous perisperma has the greatest volume...

"The fecundity of the tlaolli, or Mexican maize, is beyond any thing that can be imagined in Europe. The plant, favoured by strong heats and much humidity, acquires a height of from two to three metres." Instances are given of size and yield of maize.

"Although a great quantity of other grain is cultivated in Mexico, the maize must be considered as the principal food of the people, as also of the most part of the domestic animals. The price of this commodity modifies that of all the others, of which it is, as it were, the natural measure. When the harvest is poor, either from the want of rain or from premature frost, the famine is general, and produces the most fatal consequences. Fowls, turkeys, and even the larger cattle, equally suffer from it. A traveller who passes through a country in which the maize has been frost bit, finds neither egg nor poultry, nor arepa bread, nor meal for the atolli, which is a nutritive and agreeable soup. The dearth of provisions is especially felt in the environs of the Mexican mines where the mules consume large quantities of maize.

"Of all the gramina cultivated by man none is so unequal in its produce... If the harvest is good, the colonist makes his fortune more rapidly with maize than with wheat... The price of maize varies from two livres ten sous to 25 livres the fanega... In a country where there are no magazines, and where the natives merely live from hand to mouth, the people suffer terribly whenever the maize remains for any length of time at two piastres or ten livres the fanega. The natives then feed on unripe fruit, on cactus berries, and on roots. This insufficient food occasions diseases among them; and it is observed that famines are usually accompanied with a great mortality among the children.

"In warm and very humid regions the maize will yield from two to three harvests annually; but generally only one is taken. It is sown from the middle of June till near the end of August. Among the numerous varieties of this gramen there is one of which the ear ripens two months after the grain has been sown."

The various uses of maize as a food and drink are enumerated.

195. Humphrey, Edward Frank. An economic history of the United States. 639pp. New York, The Century co. [1931] (The Century historical series) 277.12 H88

In the chapter on Colonial Commerce, the writer states that corn entered into the earliest commercial exchange in the colonies when the white men sold firearms, beads, trinkets and rum to the Indians in exchange for corn and furs. The early settlers used wampum, the Indian money, at first as a medium of exchange but later came to use corn and beaver skins.

In later chapters of the history, the conversion of corn into liquor for greater ease of transportation is brought out. The western farmer made his corn, rye, and barley, into whiskey which was the one form in which he could profitably pack it across the mountains to eastern markets. When the government laid excise taxes on distilled liquors, such dissatisfaction arose as led to the Whiskey Rebellion in 1794.

In his discussion of the Southern plantation system, the author speaks of the self-sufficiency of the unit, and points out that most of the food products consumed were produced on the plantation. Corn, especially, was the staple item of food that furnished meal and hominy to the people and a fattening ration for hogs for bacon.

196. Hunnicutt, B. H. Corn culture in Brazil. Pan Amer. Union. Bul. 49(6): 660-670. Dec. 1919. 150.9 M76

The progress of Brazil from a corn-importing to a corn-exporting country is traced. "The importance of the Brazilian corn crop will increase rapidly in the next few years as an internal factor in her prosperity, and will figure directly in the world's trade as well as indirectly through her production of hogs and cattle. Little corn is at present used for anything but human feed and hog feed, but the time will come when it will be fed to cattle and utilized in industry."

197. Hunt, Thomas Forsyth. The cereals in America. 421pp. New York, Orange Judd co.; London, K. Paul, Trench, Trübner & co., ltd., 1917. 59 H893

Chs. VIII-XVII, pp. 138-279, are on maize - its structure, classification and varieties, improvement of varieties, climate, soil and its amendments, cultural methods, weeds, fungus diseases and insect enemies, harvesting and preparation, uses and preparation for use, production and marketing, and history.

The importance of corn as a food for domestic animals is brought out on p. 264. With grass it is said to be the meat producing material of the United States and the development of our pork industry is directly related to the corn crop. "Maize silage forms an important element in the production of dairy products and its grain is largely used as a food for horses."

The use of food for human consumption, products manufactured from corn, and by-products are discussed on pp. 264-267.

The nativity of corn, its value to the early colonists, and its introduction into the eastern continent are discussed on pp. 274-276. Maize was "the great bread plant of the New World" at the time of the discovery of the American continent.

198. Huntington, Ellsworth, Williams, Frank E., and van Valkenburg, Samuel. Economic and social geography. 630pp. New York, J. Wiley & sons, inc.; London, Chapman & Hall, ltd., 1933. 278 H92E

Climatic Optima of Crops as Illustrated by Corn is the title of Ch. IV, pp. 52-73. Pages 52-54 are devoted to the place of corn in economic geography. Corn and wheat are used as illustrations in Ch. XI which has to do with with Economic, Social, and Political Factors in Land Utilization. See pp. 216-220 for sections on the reasons why the Northeast raises so much corn, economic factors in the utilization of the land in the Corn Belt, who so much of the land is utilized for corn in the South, and why mountain farm land is largely utilized for corn.

199. Innis, Mary Quayle. An economic history of Canada. 302pp. Toronto, The Ryerson press [1935.] 277.13 In6

Bibliography, pp. 293-294.

Brief references to Indian corn are given on pp. 38, 48, 67, 114, 190, 199, 200, 280-281.

Ch. IV is on the collapse of the French Empire, 1713-1763. The following paragraph is quoted from p. 48: "Geography yielded the English in the north another advantage through the habits of the Indians with whom they traded. The disastrous wars among the southern Indians had been caused in part by a too rapid spread of European goods. The Indians on the St. Lawrence grew Indian corn, which they could carry with them, and so were able to spread European goods widely and quickly through the region. The natives about Hudson Bay were hunting tribes, fewer in numbers than the Indians farther south and without a compact, portable food product for long journeys. They depended upon fishing and hunting by the way, and were often nearly starved before they reached the posts. They had no birch bark, except in the interior, from which to make canoes, and had to travel many hundreds of miles of forest on foot. European goods and cultural traits therefore spread more slowly in the north, and the Indians were able to assimilate new ways with less drastic changes."

The use of Indian corn as the food of the French voyageurs while trading for furs as told by Alexander Henry is described on p. 67.

The use of corn in the form of hominy, as an economy measure, in provisioning the fur traders is mentioned on p. 114.

The last chapter of the book is devoted to wheat during the period 1885-1914. The following on corn is quoted from p. 221 of this chapter: "In the late nineties 'much attention is now given to the growing of the earlier maturing varieties of Indian corn, for the more advantageous feeding of cattle for dairy and beef purposes.' Indian corn soon became a staple feed crop... Indian corn tended to replace root crops, and potatoes became specialized in favourable areas such as the Maritimes."

200. International bureau of American Republics. Maize or Indian corn; the great native food supply of America. Internatl. Bur. Amer. Repub. Bul. 28(6): 989-1002. June 1909. 150.9 B87

Some statements on the importance of maize in the development of the Americas are included in this article.

"Without Indian corn the native peoples of America probably could not have developed beyond the stage of savagery, and without Indian corn the explorers from Europe would certainly have been unable, in the conditions under which they were forced to land upon the western shores, to effect a permanent settlement on the American continent. Maize was the only health-sustaining food which the Indians could supply to those who attempted to make a home in New England; it sustained the adventurers who traversed the valleys of the James, of the St. Johns, and of the Mississippi; it provided the Spaniards in Mexico with nourishment during the reckless march from Vera Cruz to the plateau of Mexico, and this same maize was found by Pizarro's small army of conquerors when they subjugated the innumerable hosts of the Incas of Peru." - pp. 989-991.

"Indian corn was found over most of the United States east of the Mississippi by the earliest explorers and settlers. It was the crop to which the Indians gave most attention, and the great staple that turned them from the nomadic life of the chase into the home-building people such as agriculturists must be." - p. 996.

"As a food product maize has few equals among the cereals. The Indians thrived on it, and so long as they continue its use they show much of their pristine sturdiness, but when by climatic or other reasons it is denied them they suffer in physique and morale." - p. 998.

In the United States, maize is a widely grown and valuable cereal and has "become, to the American people, the gauge of prosperity." The products from maize are numerous and include such well known articles as corn starch, sirup, corn meal, oil, whisky, alcohol, hominy, cellulose, pipes, and paper.

201. [Jeançon, Jean Allard, and Douglas, Frederic H.] Pueblo Indian foods. Denver Art Mus. Dept. Indian Art. Leaflet 8, 4pp. Denver, 1930. Libr. Cong. E98.A7D36

The paragraph on corn follows:

"Corn was the principal food of all the Pueblo peoples. It has been cultivated by them for thousands of years. It is found in all the prehistoric ruins. Corn is planted in the spring and harvested in the late fall. All the tasks of the corn harvest are carried out by nearly the whole population of the villages, and the whole season is one of happiness and festivity. The men do most of the picking, but women and children take an active part in the husking and sorting. Part of the ears are laid aside for seed, others for the reserve stock always kept against a crop failure, and the rest is kept in the homes and ground as needed."

202. Jenkins, Edward Hopkins. Connecticut agriculture. pp. 289-425. [New Haven? Conn., 1926?] 30.9 J41

"Reprinted from History of Connecticut with the permission of the States History Company, Inc." and issued by the Connecticut Agricultural Experiment Station, New Haven.

Cover-title: A History of Connecticut Agriculture.

In the section on Aboriginal Agriculture, pp. 290-295, is an account of Indian practices, including references to the Maya corn culture in Yucatan. "...maize was their staple and their priceless bequest to their successors, a crop which they cultivated extensively and stored for winter use. This stored corn was all that stood between the first settlers and great scarcity of food if not of actual starvation and in the earlier days of the settlement was occasionally bought of the Indians to relieve a time of scarcity. It has been one of our staple crops from Colonial times to the present and is now grown in larger quantity in the United States than any other... It [domestication of maize] is a development for which we are indebted probably to some ancient civilization in Central or South America, a development vastly more valuable than any of those of a modern 'plant wizard.'" - pp. 290-291.

In the later history of the colony, the writer calls attention again to the settlers' reliance on corn for a continuous food supply and for stock feed.

203. Jenkins, Merle T. Corn improvement. U. S. Dept. Agr. Yearbook of Agriculture 1936: 455-522. Washington, D. C., 1936. 1 Ag84Y 1936

Importance of corn as the backbone of American agriculture, pp. 456-458.

The origin of corn remains a mystery and a subject of speculation. - pp. 458-460.

Corn today is much like that centuries old. - pp. 460-461.

204. Jenks, Albert Ernest. Agriculture of the Hidatsa Indians. Science (n.s.) 44(1146): 864-866. Dec. 15, 1916. 470 Sci2

Some of the findings from the thesis which Dr. Gilbert L. Wilson submitted to the University of Minnesota for his Ph. D. degree in anthropology in June 1916 are presented. The customs and methods of planting, cultivating and harvesting corn among the Hidatsa Indians of western North Dakota are described. Although the white farmers were not so successful in growing corn in this area, the Indians had cultivated the cereal for centuries. The writer thinks that the findings of Dr. Wilson are of great importance in helping to develop a drought-resistant maize for the farmers of the Northwest - "Another contribution to American economic life by the Indian."

205. Jenness, Diamond. The Indians of Canada. Canada. Dept. Mines. Natl. Museum. Bul. 65, 446pp. Ottawa, F. A. Acland, printer, 1932. Libr. Cong. QH1.C13 no. 65

Ch. 4, Food Resources, pp. 40-52, includes statements such as: "the Iroquoian tribes subsisted very largely on maize... So greatly did the Iroquoians depend on agriculture that it actually determined the sites of their villages, which always lay close to fertile land, in places well adapted for defence. The corn fields around their villages covered an amazing area when we consider the primitive tools the Indians possessed." - pp. 40-41.

206. Jennings, Walter Wilson. A history of economic progress in the United States. 819pp. New York, T. Y. Crowell co. [1926.] 277 J44
1937 edition in Library of Congress.
Bibliography, pp. 769-772.
In a section on Indian agriculture, pp. 24-25, the writer tells, among other things, of the underground pits or barns in which the Indian women stored their corn and beans. "The Pilgrims, so it is stated, found one of these Indian barns at Truro when they had only five kernels of corn to each individual."
The following statement is made on p. 28: "Without this important food crop [corn], settlement would have been materially retarded. Corn entered to some extent in the export trade, the various colonies exporting about 600,000 bushels annually just prior to the Revolutionary War."
The following statement is made on p. 138 of a section entitled, Eastern Agriculture with Particular Reference to the North: "Corn was especially important because it supplied food for man and beast, though in 1816 it fell into temporary disrepute in the northern states because of the damage inflicted by frequent and severe frosts."
In a comparison of agriculture during the period 1850-1860 the writer states, on p. 239, that "Only in the Western States and Pacific States did the production of Indian corn increase in greater proportion than the population. For the country as a whole the per capita production was 22 bushels in 1840, 26 in 1850, and a little over 26 in 1860."
Over one-third of the corn of the Nation in 1860 was produced by the South which had one-fourth of the area and less than three-tenths of the population. - p. 241.
"Corn declined, 1859-1869, as did many other crops, but the production of about 2,500,000,000 bushels at the close of the period was treble that at the beginning." - p. 400.
On p. 568 the statement is made that "corn is by far the most important crop of the country." Statistics are given to support the statement.

207. Jennings, Walter Wilson. Introduction to American economic history. 546pp. New York, T. Y. Crowell company [1928] 277 J442
Selected references at end of chapters.
Corn is discussed on pp. 91-93. "Throughout our history corn has been the leading crop, though it was relatively unimportant in the export trade. As in colonial days it aided in pushing the settlements westward by providing food for men, for swine, for cattle, and for horses."

208. The Jesuit relations and allied documents. Travels and explorations of the Jesuit missionaries in New France 1610-1791. The original French, Latin and Italian texts, with English translations and notes: illustrated by portraits, maps, and facsimiles. Edited by Reuben Gold Thwaites. 73v. Cleveland, The Burrows brothers co., 1896-1901.
Libr. Cong. F1030.7.C96
These volumes contain numerous references to Indian corn - its cultivation by the Indians and by the Jesuits, methods of Indian and Jesuit storage, history, use as food, etc. These references may be found by consulting the indexes, under the subjects Corn in v. 72 and Maize in v. 73.

209. Jones, Charles Colcock, Jr. Antiquities of the Southern Indians, particularly of the Georgia tribes. 532pp. New York, D. Appleton & co., 1873. Libr. Cong. E78.G3J6

Bibliographical footnotes.

The greater part of Ch. XIII, pp. 296-330, which deals with the agriculture of the Southern Indians, is devoted to the cultivation and harvesting of maize, ceremonies in connection with it, and mortars and pestles used in preparing the corn.

"By nothing was the gradual development of the semi-civilization of the Muscogulges, the Creeks, the Choctaws, the Cherokees, and other Indian tribes more clearly indicated than by their general and regular cultivation of the maize, an American plant, whose value - recognized by these aborigines for many antecedent centuries and extensively appreciated at the dawn of the historic period - has ever since received ready acknowledgment wherever introduced to the notice of civilized man. Regarded as a direct gift from the Author of Life to his red children, it was highly prized and held in peculiar esteem." - pp. 296-297.

210. Jones, Llewellyn Rodwell, and Bryan, P. W. North America; an historical, economic and regional geography. Ed. 5, rev., 578pp. London, Methuen & co., ltd. [1938.] 278 J72N Ed. 5

Ch. XV deals with the agriculture of the corn belt, and the author discusses the place of corn in American agriculture, and the methods of production and utilization.

"From the standpoints of both acreage and production, maize or corn, as the Americans call it, is by far the greatest of the cereal crops in North America. It is essentially an American crop... It has been estimated that it is grown on three out of every four farms in the United States... It has been further estimated that roughly about one-half of the total money received for cereals in the U. S. A. is obtained for corn.

"From America this grain has spread to many parts of the world. When the first settlements took place in America, they succeeded mainly because of the ease with which maize could be grown on land just newly cleared of forest with a minimum of cultivation. It was the staple cereal of the indigenous Indian population. To-day it can be regarded as the real foundation of the greater part of American agriculture, since without it to act as food-stuff for hogs and cattle, the typical economy of the average American farm would have to be of quite a different character." - p. 224.

"The maize production of Mexico is of outstanding importance. Together with beans, maize in the form of the tortilla, or hot corn-cake, is the staple food of the Mexican peasants. Over half of the Mexican production is grown under very primitive agricultural conditions...it is only in the southern Cotton Belt of the United States that maize is largely used for human food... Maize in one form or another formed the staple food of the Confederate soldiers during the Civil War...

"As a human food, corn is also converted into oil, into starch and also into glucose, a form of sugar." - p. 230.

211. Joyce, Mrs. Lilian Elwyn (Elliott). The Argentina of today. 284pp. London, Hurst and Blackett, [1926] Libr. Cong. F2815.J68

Argentina is said to be the most accessible of the big wheat-producing countries with a surplus. "Argentina's position seems secure not only because she can grow lots of wheat cheaply and has quick access to markets, but because her surplus is likely to remain at a big figure. The reason is that a proportion of the population understand (as Europe does not) the value of maize as a food, and uses at home two million tons a year of this cereal."

212. Joyce, Thomas Athol. Mexican archeology, an introduction to the archeology of the Mexican and Mayan civilizations of pre-Spanish America. 384pp. London, P. L. Warner, 1914. (Handbooks to ancient civilizations series) Libr. Cong. F1219.J89

There are a number of references to maize mostly in connection with religious ceremonies or superstitions. The method of cultivation and preparation of maize are noted on p. 298.

213. Judd, Neil M. Everyday life in Pueblo Bonito. As disclosed by the National geographic society's archeologic explorations in the Chaco Canyon national monument, New Mexico. Natl. Geogr. Mag. 48(3): 227-262. Sept. 1925. 470 N213

A paragraph on p. 235 notes that "in Pueblo Bonito a daily task for the daughters of every household was the preparation of the allotted ration of maize. Metates [grinding stones] were brushed with a bunch of grass; the corn was shelled and crushed to a degree of fineness dictated by the particular use for which it was intended."

No definite reasons are given for the abandonment of Pueblo Bonito, but it is suggested that among them may have been the dwindling of the water supply, successive years of drought or sterility of the fields caused by long-continued irrigation.

214. [Kalm, Peter.] Pehr Kalm's description of maize, how it is planted and cultivated in North America, together with the many uses of this crop plant, translated by E. L. Larsen. Agr. Hist. 9(2): 98-117. Apr. 1935. 30.98 Ag8

This is a translation of "an obscure article by the celebrated botanist, Pehr Kalm, which is here translated from the Swedish for the first time. It appeared in two parts under the title, 'Beskrifning om Mays, Huru den planteras och sköts i Norra America, samt om denna Sädes-artens mångfaldigs nytta,' (Description of maize, how it is planted and cultivated in North America, together with the many uses of this crop plant), in the Kongl. Svenska Vetenskaps Academiens Handlingar, 12: 305-318 (1751); 13: 24-43 (1752). As a statement of agricultural practices in the cultivation of corn the article is considered one of the most complete as well as one of the earliest. Kalm was extremely enthusiastic about the possibilities of maize as an economic crop because it could be used so advantageously by both man and beast." - p. 98.

In addition to the description of the method of cultivating maize, Pehr Kalm tells of the methods the Indians and the English settlers used in storing maize and describes the various ways in which it was used for food and for the making of near beer and fine spirits. He also describes how it was used as a concentrated food by the Canadian fur traders and as a feed for livestock and poultry and of how wild animals preferred it to other cultivated cereals.

In connection with his account of the fondness of rats, squirrels, crows, etc., for corn he devotes a page to an account of these maize thieves and steps taken to exterminate them because of their destruction of the crop. Pennsylvania paid a bounty for squirrel heads and almost bankrupted the treasuries of the various regions. "Many young people in particular gave up all other work and went to the woods to shoot squirrels. The legislature was therefore forced to repeal the law and change it from 3d. bounty to half that sum for a head." A similar law was passed in New England with rather disastrous consequences. Maize thieves were practically exterminated, but grass worms which had previously been eaten by the maize thieves "spread over the entire country, destroying all the hay crop for that year." Then the New England people "were conscience-stricken because they believed this to be a punishment for meddling in the providence of the Almighty Creator."

215. [Kalm, Peter.] Peter Kalm's travels in North America. The English version of 1770, revised from the original Swedish and edited by Adolph B. Benson...with a translation of new material from Kalm's diary notes. 2v. (797pp.) New York, Wilson-Erickson inc., 1937. 125 K12A

A bibliography of Peter Kalm's writings on America, pp. 770-776 (v. 2).

This is an English version of the diary of a young Swede who visited America, particularly Pennsylvania, New York, New Jersey, and southern Canada, during the years 1748-1751, and who was "apparently the first efficient naturalist to conduct comprehensive and methodical studies in the Colonial settlements and make his findings known in a large way." - p. xiii of Introduction.

His diary contains references to Indian corn as follows:

"The grain which the Indians cultivate chiefly is corn, or Zea mays L., and they have little fields for that purpose." - p. 74.

A paragraph on p. 89 is devoted to the growing of corn in New Jersey. He comments particularly on the fact that corn grew extremely well in New Jersey, although the soil was dry and poor. "A sandy ground could never have been better employed."

He has the following to say about the growing of corn by Swedes who lived near Raccoon, New Jersey (now Swedesboro): "The Swedes and all the other inhabitants of the country plant great quantities of corn, both for themselves and for their cattle. It was asserted that it is the best food for hogs, because it makes them very fat, and gives their flesh an agreeable flavor, preferable to all other meat. I have sent two detailed dissertations on this cereal to the Swedish Royal Academy of Sciences, which are found in their Memoirs for the years 1751 and 1752, and thither I refer my readers." - p. 179.

A brief description of the Indian method of storing corn is given on pp. 268-269.

Comments on the growing of corn and its advantages over wheat are given on p. 335.

On p. 533 mention is made of the fact that Indians who "live far southward" in Canada plant corn, wild kidney beans, pumpkins, gourds, watermelons and melons for food, but those who "live far north...cannot plant anything on account of the great cold."

A paragraph on p. 615 is devoted to a description of methods of preparing corn for food.

216. Kelsey, Vera, and Osborne, Lilly De Jongh. Four keys to Guatemala. Ed. 1, 332pp., illus. New York and London, Funk and Wagnalls co., 1939. 280.15 K29

Bibliography, pp. 319-322.

"Sometime between 2000 and 1000 B.C., a wild grass - teocintle - growing on the plateaus of southern Mexico and northern Guatemala became the ancestor of the maize or corn. By 1000 B.C. its use was known to small nomadic groups called Maya living in the forests of what is now the Department of Petén, Guatemala. When they planted this seed, they planted also the first seeds of civilization on the western hemisphere.

"With the means of providing food at hand, the Maya abandoned their nomadic life and settled down to farm. From this beginning grew a Maya Empire that spread beyond the forests to include western Honduras, British Honduras, the states of Chiapas and Tabasco in Mexico, and all of Guatemala of today. Hence derives Guatemala's title, 'Land of the Maya'...when they had developed agriculture until they not only had sufficient food but reserves in great storehouses, the Maya turned their attention to the arts and sciences." - p. 5.

"The first four men created, according to the legend of the origin of the Quiché nation, were made of cornpaste into which the Heart of Heaven breathed life. Whether or not their ancestors were made of corn, it is certain that the Indians of today live by it. It is eaten at every meal in a score of different dishes; it is the feature of every feast; it feeds their animals and chickens, thatches their huts, is an important source of revenue.

"Nothing is more important, therefore, than to insure by every possible means that the harvest will be bountiful." The ceremonies that take place at the time of the planting are described as well as those that accompany the harvest. "The selection of seed corn for the next planting is of prime importance and is determined in numerous ways." - pp. 43-45.

"Corn is grown in all sections, with a normal production of 3,000,000 quintals and an approximate value of $4,500,000 annually. In years of crop failures, as in 1936, the government, to prevent price speculation, imports and sells corn at a reasonable increase. One failure insures a bumper crop and lower prices the following years, as every hut will have at least one small patch around its door."

217. Kempton, James Howard. Maize and man. Jour. Heredity 17(2): 33-51. Feb. 1926. 442.8 Am3

Corn has been "the basic food plant of the people of two continents, cultivated by the earliest inhabitants of the Americas for untold centuries and the object of intensive investigation by many specialists, but taken very much as a matter of course by the countless thousands whose heritage it is... Archeological exploration and excavation clearly demonstrate that the three most elaborate civilizations developed on this hemisphere, Inca, Maya, and Aztec, were all supported by maize. To all these people the plant was of sufficient importance to merit the belief that it was a gift from the gods, to be accorded the respect and care that such gifts deserve. In at least one instance, that of the Maya, the decline and fall of civilization was concomitant with and probably caused by the decline in production of maize." - pp. 35-37.

"The present-day emphasis of biological research lies in attempting to produce heritable variations by artificial methods which will permit repetition at will... These are problems for future solutions and to these solutions the maize plant may be expected to contribute, as in the past it has contributed to the solution of other problems of heredity. That the controlled production of new characters offers untold possibilities for the future well-being of man, not only with respect to his diet but also in its eugenic aspects, needs no emphasis. And it is a pleasing thought to entertain, that maize may become a sort of beneficent Frankenstein, developed by man first in supplying his material wants and later serving for his intellectual advancement." - p. 51.

218. Kempton, James Howard. Maize - our heritage from the Indian. Smithsn. Inst. Ann. Rpt. 1936/37: 385-408. Washington, D. C., 1938. 500 Sm63 1936/37

Illustrated by 30 plates.

In his introduction, the writer stresses the importance of corn in the civilizations of the New World, from the earliest times to the present. He then traces its history, and presents the theories of its origin and birthplace and discusses them quite fully.

"The key crop of the New World agriculture and the chief basis of Indian economy was the noble grass we know as corn, as Indian corn, or as our derivative of its Arawak name - maize. Although the European races have largely displaced the Indian population of the Americas, corn has retained its place as the principal crop of the New World. It is grown in every State of the United States and is by far the most valuable single crop produced in the Western Hemisphere. It is the only domesticated plant that can be grown over the entire range of climate, soils, and day lengths found in the territory extending from the Canadian border through the Central American tropics to southern Chile, and from sea level to an altitude of 12,000 feet.

"No other cereal is as useful to man in so many ways. Not only are the seeds borne in handy packages of from 500 to 1,000, but they are edible and nutritious long before maturity. The ears of corn lend themselves well to storage, and the seeds, being naked, require no

threshing or winnowing. The crop produces more food value per unit of area than any other grain, though of course less per man-hour than the Old World cereals such as wheat, which require no care after planting. The American agricultural system, based on hand labor and involving either irrigation or the clearing of forests every few years, required a cereal giving maximum returns for the land used. And in maize the American Indian developed a food plant capable of supporting a family of five for an entire year on the production from 4 acres.

"Not only are the seeds of corn edible scarcely 3 weeks after fertilization, but other parts of this plant were eaten. The Indians made a palatable soup from the corn pollen which is produced in such great abundance, and they also prepared a food from the tassels. Even the fungus parasite - the common smut - furnishes a food highly appreciated by certain Indian tribes of Mexico, much as the Chinese value the smutted shoots of wild rice. Maize, however, supplied more than mere food to the Indian. It was an important part of his religious life, and quite early the element of art entered his breeding of this grass, for in no other way can we account for the highly decorative features of this majestic plant...

"Corn was an object of veneration to the Indians and figured in their art no less than in their diet. The plant was skillfully formalized for pottery decoration without sacrificing its distinctive characteristics...

"In our country before our agricultural antecedents were swamped by the industrial era, the corn plant had begun to find its place in the decorative arts. Benjamin Latrobe, who had so much to do with the building of the Nation's Capitol, made use of ears of corn in a design for column capitals used in that structure at the entrance to the old Supreme Court library. These capitals are the oldest known replicas of maize wrought by Europeans. They have stood in their present location since their installation, having survived the burning of the Capitol by the British. Most of the other adornments of the Capitol have been shifted around, altered, or rebuilt, but these corn columns, like the living plant in our civilization, have remained permanent. Our southern planters, too, carried their devotion to agriculture with them when they built their town residences, and several styles of attractive iron corn fences still enclose some of the gardens in New Orleans.

"At the present time with the shift of our population from the farms to the cities, the close connection between corn and our prosperity is not appreciated... Yet we are today very much of a corn civilization, with an annual per capita consumption of approximately 16 bushels. The agricultural Indians subsisting principally on corn - so much so that in some places this grain comprises 85% of the diet - do not consume more. It is true, corn does not enter directly so completely into our diet as it does that of the Central American Indians, but it is an important part of our economy.

"Aside from its materialistic value, maize has also become important to our intellectual development, for this plant has proved to be almost uniquely fitted for determining the facts of heredity. Students of genetics, the science of heredity, have described and analyzed several

hundred mutations in maize and in so doing have advanced our knowledge of how traits are transmitted from one generation to another. By means of the maize plant they have solved many of the problems of the cell mechanics involved in reproduction.

"Despite its importance in ancient and in modern times nothing certain is known as to the origin of corn." - pp. 385-388.

In his section on the History of Corn, the writer states:

"Corn, of course, is referred to in early colonial documents, all the accounts showing it to be a completely domesticated plant nurtured by the Indians. The Indians whose welfare depended upon this plant, attributed its origin to the gods, and some of these legends orally preserved through the centuries have been recorded. Many elaborate ceremonies were evolved to insure the welfare of this cereal, but neither the legends nor the ceremonies afford any clues as to how corn came to be the plant it is.

"The first written records, then, show that corn 400 years ago was as it is today and the Indian accounts of its origin, though poetic, are but fanciful myths. Fortunately, the archeological record is more extensive and embraces a much longer period of time than the printed accounts. Excavations in Bolivia and in Peru have disclosed ears of corn perhaps 2,000 years old, and in our own country, Basket Maker burials in Utah, roughly a thousand years old, have yielded perfectly preserved ears. From the mounds of Ohio and the caves of the Ozarks have come charred specimens of grain and cobs that show corn in no wise different from the kinds that must have been grown by the Indians of the same region within historic times. The ears of corn from the Peruvian graves interred about the beginning of our Christian era cannot be distinguished from the ears produced in the same region today. Similarly, the ears of corn buried by the ancient Basket Makers are duplicated today by the ears harvested each fall by our Southwestern Indians... These pottery replicas and exhumed ears all attest that corn as we know it today was a finished product at least 2,000 years ago, so far as its distinctive characteristics are concerned." - pp. 388-389.

"This highly domesticated cereal furnished the foundation of the three remarkable Indian civilizations - Maya, Inca, and Aztec - yet even today it cannot be said with certainty where, how, or when corn originated. Definite answers to any one of these uncertainties would go far toward solving some of the perplexing questions of the antiquity of man and his civilizations in America, for maize and man are inseparable." - p. 390.

219. Kempton, James Howard. Maize, the plant-breeding achievement of the American Indian. Smithsn. Inst. Smithsn. Sci. Ser. 11: 319-349. 1931.
500 Sm6Sc v. 11

This study consists of two chapters, the first of which is entitled, The Domestication of Plants as a Measure of Civilization, and the second is called The Origin of Maize.

"From purely botanical reasoning, based on a detailed comparison of maize with its wild relatives, Indian corn may confidently be proclaimed the most ancient of the cultivated cereals, if not of all cultivated

plants. The botanical evidence is clear and unmistakable, however defective the historical and anthropological record may be. Indian corn represents the supreme achievement in the domestication of plants." - pp. 324-325.

"If ever a plant could be said to be designed for the use of man that plant is Indian corn. And in accordance with this seemingly providential plan, maize and man are inseparably associated in America as far back as human remains are found. Nowhere does maize grow without man's aid, nor can it." - p. 326.

"Maize, then, is a plant which has been cultivated for thousands of years, meeting the food requirements of man and beast and providing the foundations for the three elaborate American Indian civilizations - those of the Mayas, Incas, and Aztecs." - p. 329.

"The crowning achievement of the American Indian. Whether selection, hybridization, mutation, or a combination of all three is eventually settled upon as the answer to the origin of maize, botanists are agreed that the American Indian played the largest part in the development of this remarkable grass. To him and to him alone belongs the credit for bringing this cereal to its present high stage of development. He it was who distributed it throughout the New World and, with a patience only equaled by the Chinese, slowly pushed the frontiers of maize culture across the deserts to the fertile plains of the north, and through the tropical jungles to the temperate south. To his efforts the world owes the only cereal which can be cultivated from Canada to Chile, producing food almost equally well in the short seasons of the far north and extreme south and in the twelve-month season of the Tropics.

"Thus, for unknown centuries maize has been intimately associated with the life of man in the Western Hemisphere. From the plains of southern Canada, across the tablelands of Mexico, through the deep valleys of the Andes, to southern Argentine this splendid grass has provided not only the chief food of the inhabitants but their artistic and literary inspiration as well." - p. 346.

220. Kempton, James Howard, and Popenoe, Wilson. Teosinte in Guatemala. Report of an expedition to Guatemala, El Salvador, and Chiapas, Mexico. Carnegie Inst. Wash. Contribs. to Amer. Archaeol. 4(23): 199-217. 1937. Libr. Cong. E51.C32 v. 4

"This expedition was made under a cooperative project established by the Carnegie Institution of Washington and the Bureau of Plant Industry, U. S. Department of Agriculture, for the purpose of investigating the distribution of maize relatives and the origin of maize. The United Fruit Company placed its facilities at the disposal of the authors and cooperated further by granting leave to Dr. Wilson Popenoe to become a member of the party."

"The Old World civilizations were supported on rice, barley, wheat, or sorghum but all civilizations in the New World were founded on maize. The advances made by the Incas, Maya, and Aztecs were made on maize and even today this cereal comprises eighty-five percent of the diet of the Indians of certain parts of Mexico and Central America. Although this

probably constitutes a record for a one-crop diet, maize also is the most valuable crop produced in the United States and is an important grain crop in certain parts of Europe and Asia.

"The origin of this cereal remains a mystery, the solution of which would contribute to the vexing question of the antiquity of man in America and might aid in determining the relationship of the North and South American civilizations." Several theories are enumerated with regard to the origin of maize and its connection with teosinte. The distribution of teosinte as a wild plant is said to be of importance in delimiting the area in which maize may have originated.

"Teosinte from one region differs from that in another in many characteristics much as maize differs from region to region. In general the teosinte of a given region has the plant characteristics of maize growing in the same region and it is reasonable to suppose that the resemblances have come about through generations of inter-crossing between these genera...

"None of the localities in Mexico where this plant occurs can compare with San Antonio Huixta [Guatemala] in the number of plants per acre or in the number of acres in which teosinte is the dominant plant...

"In so far, therefore, as teosinte may be considered as directly involved in the creation of maize it may be concluded that the most probable region for the origin of maize has been shifted from the Aztec tablelands of Mexico to the Maya highlands of Western Guatemala."

221. Kidder, Alfred Vincent. An introduction to the study of southwestern archeology, with a preliminary account of the excavations at Pecos. 151pp. New Haven, Pub. for the Dept. of archaeology, Phillips academy, Andover, Mass., by Yale university press, 1924. (Papers of the Southwestern expedition, no. 1) Libr. Cong. F786.P56 no. 1

This book is in three parts as follows: Pt. 1, History of Pecos; Pt. 2. Fieldwork at Pecos; Pt. 3. Southwestern archaeology; Pt. 4. Conclusions. Bibliography, pp. 137-151.

See Pt. 4 for the author's deductions regarding the introduction of maize and of farming in the Southwest. "How long ago Mexican agriculture began is unknown: the remains indeed, of the first farmers, the Mexican basket makers so to speak, still await discovery. Corn, however, is a very highly specialized cereal, a fact which would seem to indicate great antiquity. Be that as it may, corn-growing was without any question the factor which made possible the development of all the higher American civilizations, and so the discovery of agriculture must have long antedated their rise."

222. Kirkland, Edward C. A history of American economic life. 767pp. New York, F. S. Crofts & co., 1932. (Crofts Amer. history series) 277.12 K63

A revised edition was issued in 1939.

Bibliography, pp. 713-755.

The following is quoted from a chapter on Production in the British Colonies, p. 53: "Indian corn, conquering at once European prejudices, became the great food staple in every colony from Maine to Georgia.

As a pioneering crop it was a superlative grain. Its flour could be made into more varieties of food than wheat, and it was an excellent food for live stock... Finally, it had the advantage of being distilled, and in a country without any means of transportation the valuable but smaller bulk of liquor would pay for the cost of transportation."

The Farmer in the Machine Age is the title of Ch. XII, pp. 499-554. The production and use of corn are discussed briefly in two paragraphs on pp. 519-520. The following is quoted from the first paragraph: "Carlyle wrote to Emerson, 'How beautiful to think of lean tough Yankee settlers, tough as gutta-percha, with most occult unsubduable fire in their belly, steering over the Western Mountains, to annihilate the jungle, and bring bacon and corn out of it for the Posterity of Adam!' This sentence was a compact history of that remarkable American crop."

223. Klin, Lester E., Starkey, Otis P., and Hall, Norman F. Introductory economic geography... With 166 maps and graphs drawn by G. Etzel Pearcy. 492pp. New York, Harcourt, Brace and co., 1937. 278 K68

Ch. 16, Corn and Forage Crops, pp. 148-156, contains material on the dependence on corn in Colonial America, the producing areas and enormous production of corn as compared with other cereals, uses of corn, effect on the standard of living, the place of corn in several major agricultural regions, with special emphasis on the Corn Belt of the United States.

In speaking of corn-growing by the Pilgrims, the writer states: "The abundant yield of their first corn crop was one of the principal reasons for the celebration of the first Thanksgiving Day." - p. 148.

The Corn Belt has the most favorable climate and soil for corn production of any place in the world. "This is, however, in no sense solely a corn region, but is one in which the whole economy of the farm centers around the corn grown. It is one of the most highly developed regions of mixed farming in the world and attains a level of agricultural prosperity and living standards found in very few other areas. Here, a combination of the best in the utilization of land, crops, machinery, and animals to obtain and maintain a long-run agricultural stability has been worked out." - p. 151.

"There is a direct relationship between the standard of living and the use to which corn is put. Usually, the higher the standard of living the smaller will be the amount of corn used for human food and the larger will be the amount fed to animals or converted into other products. For example, in the United States relatively little corn is used for human food, but much is fed to cattle and hogs. To this country 'corn on the hoof' has a greater importance than 'corn on the cob' because the population is not living so close to the subsistence level." - p. 150.

224. Klippart, John Hancock. The wheat plant: its origin, culture, growth, development, composition, varieties, diseases, etc., etc., together with a few remarks on Indian corn, its culture, etc. 706pp. Cincinnati, Moore, Wilstach, Keys & co., 1860. 59 K68

History, Culture and Varieties of Indian Corn, Ch. 22, pp. 639-675. The material on the history of corn in this chapter is based largely on Histoire Naturelle du Maize by Bonafous and on other authorities. The writer concludes that maize was known in the Old World before the discovery of America, that it was not of American origin, and that it was probably first introduced into Europe by the Arabs or the Crusaders. However, the first Europeans who landed in the New World found maize cultivated by the aborigines.

"Every nation in Mexico, Peru, Brazil, Orinoco's plains, Antilla Islands, were nourished with that grain. Maize, cultivated over a space ninety degrees south and north of the Equator, was the wheat of the new hemisphere; it was there used as money or standard of exchange; and the law, among Mexicans, condemned to death whoever stole seven ears of maize." - p. 646.

225. La Farge, Oliver, and Byers, Douglas. The Year Bearer's people. Tulane Univ. La. Middle Amer. Res. Ser. Pub. no. 3, 379pp. New Orleans, La., 1931. Libr. Cong. F1421.T95 no. 3

Bibliography, pp. 355-360.

This is an account of an expedition to the Guatemala-Mexico border.

"The chief and foremost occupation of the men, and heart of the Indian's life is agriculture, and yet more specifically the raising of corn (Zea Maiz). This staple probably comprises more than seventy-five per cent of the total crops raised by them... Their manner of cultivation,...the well known 'milpa system', is conservative." A description is given. "According to statements by Indians and Ladinos, the same piece of ground will continue fertile over a long period of years, if allowed to lie fallow at frequent intervals. Certainly all the fields that we saw in the municipality of Jacaltenango were in ground that had been long cultivated... The land has been worked since early times, always according to this wasteful system, without fertilization or rotation, taking everything out and putting nothing back; yet there can be no doubt of the justice of Jacaltenango's reputation for fertility."

"It is true that an enormous area of land is needed for the farming of a relatively small number of people...

"The burning off of the fields was begun in the low country in February, and was taken up progressively in the higher country until, in May, the hills behind Concepción and the high slopes of Payá were alive with fire at night. This is curious, as it is in the high country that the planting begins. Around Todos Santos, corn was already being planted in February; at Jacaltenango they did not begin until the rains were almost due, in May, while in the lowlands they do not plant until the rains have actually started, because, they say, if they do, the corn will all be eaten by insects. Unlike the corn of most of the United States, theirs requires heavy rain and plenty of it to do well, it is during the downpours of the rainy season that the plants thrive.

"Over most of this district there is only the first, or milpa, crop of corn... In some of the lowest parts, particularly if they can irrigate, they plant the second."

The method of planting, cultivation, and harvesting is briefly noted. The different kinds of corn that grow in the "Hot Country," the "Temperate Country" and the "Cold Country" are enumerated. In this last the people "raise more corn than they need, and carry on a considerable export business in it. For 'una cuerda buena,' about a third of an acre...they say they expect about two quintals of corn. This is about the same yield as estimated by Termer, four hundredweight for four cuerdas, but according to him the Indians of the higher parts of the Cuchumatanes cannot raise, with this yield, enough to support themselves. This may be because owing to the difficulties of the terrain, they can put less area per family under cultivation.

"Most of the territory is privately owned by individuals or families. A certain amount of land is unclaimed and there is a community field called in Spanish, the milpa de Dios, God's cornfield, for poor people, and certain other fields are cultivated by the community for civil and religious officials."

226. Landa, Diego de. Yucatan before and after the conquest...with other related documents, maps and illustrations; translated with notes by William Gates. 162pp. Baltimore, The Maya society, 1937. [The Maya society. Publication no. 20] Libr. Cong. F1435.A3 no. 20

The translator in his introduction states that "ninety-nine percent of what we today know of the Mayas, we know as the result either of what Landa has told us in the pages that follow, or have learned in the use and study of what he told." In July 1562 at Mahí Bishop Landa burned 27 hieroglyphic rolls as "works of the devil." It is probable, therefore, that "he burned ninety-nine times as much knowledge of Maya history and sciences as he has given us in his book."

The references to maize are few and scattered. Section XXI deals with food and drink of the Indians of Yucatán. In it we find that "Their principal sustenance is maize, of which they prepare various dishes and drinks; and even drunk as they do it, it serves as their food and drink." The method of grinding and cooking it is described.

"The commonest occupation was agriculture, the raising of maize and the other seeds; these they kept in well-constructed places and in granaries for sale in due time. Their mules and oxen were the people themselves. For each married man and his wife it was their custom to plant a space of 400 feet, which was called hun vinic [one man], a plot measured with a 20-foot rod, 20 in breadth and 20 in length. The Indians have the excellent custom of helping each other in all their work. At the time of planting, those who have no people of their own to do it join together in bands of twenty, or more or less, and all labor together to complete the labor of each, all duly measured, and do not stop until all is finished. The lands today are in common, and whoever occupies a place first, holds it; they sow in different places, so that if the crop is short in one, another will make it up. When they work the land they do no more than gather the brush and burn it before sowing. From the middle of January to April they care for the land and then plant when

the rains come. Then carrying a small sack on the shoulders they make a hole in the ground with a stick, dropping in five or six grains, and covering them with the same stick. When it rains, it is marvelous how they grow." - Section XXIII.

"The seeds they have for human sustenance are very good maize, of many different kinds and colors; of this they gather much and keep in a granary or silo for poor years."

227. Langworthy, C. F., and Hunt, Caroline L. Corn meal as a food and ways of using it. U. S. Dept. Agr. Farmers' Bul. 565, 24pp. Washington, D. C., 1914. 1 Ag84F no. 565

The following is quoted from a section on Origin of Indian Corn, pp. 2-3: "Indian corn has special historical interest for Americans from the fact that it is generally recognized as being native to American soil. It was originally a tropical or subtropical plant, but the Indians, though unconscious of the trend of their attempts to extend corn growing, nevertheless succeeded in evolving varieties which would ripen as far north as Canada. Its cultivation and use, therefore, even in the early days were very widely distributed in America. With fish and game it made the staple food of the Indians, and except for wild rice, which grew abundantly in shallow fresh waters, and the seeds of certain wild grasses (both used in relatively small quantities), it was the only cereal known to them.

"In all the history of America corn has played an important part. The desire to produce it was probably the incentive which most frequently led the Indians to abandon nomadic life and to form settlements. Because of the quickness and ease with which it can be raised, it was doubtless, too, the means of saving from starvation many of the pioneers who came from other lands to settle here. So important was this food in the days when the country was being settled, that both Indians and colonists in their controversies often found it more efficacious to destroy the corn crops of their adversaries than to make open war upon them.

"After the discovery of America the use of corn spread rapidly to other countries, and it is now very generally raised in all regions of the world where it will flourish. So generally has it come into use that it now ranks with wheat, rye, barley, oats, and rice as one of the food grains of the world and may be called the American Indian's greatest gift to modern civilization."

228. Lantis, Lee Ora. [Series of two articles on the first American farmers] Ohio Farmer 164(3-4): 60-61, 80-81. July 20-27, 1929. 6 Oh3

The first article is entitled The First American Farmers. Authentic Accounts of the Red Men's Agriculture; and the second, The First Americans' Food and Cookery; Interesting Data Gleaned from Ancient Chronicles.

In these two articles, the writer gives an account of the agricultural practices and various products grown by the Indians, and their ways of cooking and preparing corn and other articles for food, and of drying and preserving and storing meats, corn, rice, etc., for future use in times of scarcity. Corn was one of their most important products

and it was extensively cultivated in many parts of the United States. Fish were put in the hills with the seed corn at planting time to provide fertilizer for the grain.

229. Lawson, John. History of North Carolina... Being a reprint of the copy now in the North Carolina State library, Raleigh, presented by President James Madison, in the year 1831. vii, 171pp. Charlotte, N. C., Observer printing house, 1903. Libr. Cong. F257.L44

Compiler's preface, by Fred A. Olds, pp. iii-vii.

First printed in London in 1709 as A New Voyage to Carolina.

The following on corn is quoted from pp. 42-43: "The Indian corn or maiz proves the most useful grain in the world; and had it not been for the fruitfulness of this species, it would have been very difficult to have settled some of the Plantations in America. It is very nourishing whether in bread, sodden or otherwise, and those poor Christian servants in Virginia, Maryland and the other northerly Plantations, that have been forced to live wholly upon it, do manifestly prove, that it is the most nourishing grain, for a man to subsist on, without any other victuals. And this same assertion is made good by the negro slaves, who in many places eat nothing except this Indian Corn and Salt. Pigs and Poultry fed with this grain prove the sweetest of all others. It refuses no ground except the barren sand, and when planted in good ground will repay the planter seven or eight hundred fold, besides the Stalks bruised and boiled, make very pleasant Beer, being sweet like the Sugar-Cane."

230. Leighty, C. E., and others. The corn crop, by C. E. Leighty, C. W. Warburton, O. C. Stine, and O. E. Baker. U. S. Dept. Agr. Yearbook 1921: 161-226. Washington, D. C., 1922. 1 Ag84Y 1921

"The corn crop is considered in this article from a broadly economic standpoint, principal attention being given te those things which determine its profitableness to the farmer, and to showing the steps by which corn has come to occupy the place it holds in the world to-day." - p. 161.

The importance of corn in the United States, pp. 161-164.

Historical development, pp. 171-175.

The following is quoted from pp. 219, 221: "The history of the United States has been influenced largely by the corn crop. No picture of our national life is complete that does not portray corn as one of the most important factors in our national development and prosperity. Long before the coming of the white man, the Indian depended upon corn as a principal source of food. The white man in turn adopted the culture of corn in the very beginning and the early Colonies would have failed had this crop not been ready at hand to nourish and sustain them. The western advance of our civilization and the development of our prairies are but instances of the part that corn has played in our advance to a place among the nations of the world."

231. Le Page du Pratz. The history of Louisiana, or of the western parts of Virginia and Carolina: containing a description of the countries that lye on both sides of the river Missisipi: with an account of the settlements, inhabitants, soil, climate, and products. Tr. from the French. 2v. London, T. Becket and P. A. De Hondt, 1763. Libr. Cong. F372.L55 Office

French original published 1758.

On pp. 304-308 of Volume I there is a brief description of the cultivation of maize and its use as food.

Ch. I of Volume II contains a brief account of the kind of maize produced in Louisiana, its growth, and its use for food and drink. - pp. 3-5.

232. Lescarbot, Marc. Nova Francia: or, the description of that part of New France, which is one continent with Virginia. Described in the three late voyages and plantation made by Mons. de Monts, Mons. du Pont-Gravé, and Mons. de Poutrincourt, into the countries called by the Frenchmen, La Cadia, lying to the Southwest of Cape Breton. Together with an excellent several treaty of all the commodities of the said countries, and manners of the natural inhabitants of the same. Translated out of the French into English by P[ierre] E[rondelle]. In Osborne, Thomas, comp. A collection of voyages and travels, v. 2, pp. 795-917. London, Printed for and sold by Thomas Osborne of Gray's-Inn, 1745. Libr. Cong. G160.O81

This interesting old volume contains marginal headings which aid in a quick examination of the contents as there is no index. It contains a number of references to the sowing of corn, pp. 830, 832, 834, 838, 846, 847, 878, and 905.

"The Armouchiquois, and other nations more remote, besides hunting and fishing, have wheat called mais, and beans, which is a great comfort unto them in time of necessity; they make no bread with it, for they have neither mill nor oven, and they cannot knead it otherwise than in stamping it in a mortar, and in gathering those pieces the best they can, they make small cakes with it, which they bake between two hot stones; most often they dry this corn at the fire, and parch it upon the coals." - p. 878.

Methods of cultivation and storage are described on p. 905.

233. Linton, Ralph. The significance of certain traits in North American maize culture. Amer. Anthropol. (n.s.) 26(3): 345-349. July-Sept. 1924. Libr. Cong. GN1.A5

Describes and discusses the significance of, the maize complexes of the East, the Southwest and Mexico.

234. Lippincott, Isaac. Economic development of the United States. Ed. 2, 771pp. New York, London, D. Appleton and co., 1927. 277.12 L66

References at end of chapters.

See p. 63 of the chapter on Colonial Agriculture for statement on the valuable aid received by the colonists from the Indians,

particularly in the case of Indian corn. This product, which had little or no demand in Europe, was "an invaluable aid in establishing the first colonies in the New World, and continued to be one of their chief supports in their subsequent migration across the continent."

235. Lippincott, Isaac. Economic resources and industries of the world. 656pp. New York, London, D. Appleton and co., 1930. 278 L66
The role of corn in the history of the North American continent is brought out on pp. 288-289. In this connection the writer quotes from Shaler (Nature and Man in America) who said that the plants of the New World "have been sufficient to make something like a revolution in the economic conditions of our civilization."

236. Lippincott, Isaac. Pioneer industry in the West. Jour. Polit. Econ. 18(4): 269-293. Apr. 1910. Libr. Cong. HB1.J7
Bibliographical footnotes.
"Much of the material in this article is contained in a monograph written by the present writer for the Carnegie Institution of Washington, under the title of Industrial History of the Central Mississippi Valley."
The place of corn in the pioneer life of the West is discussed on pp. 275-279.
"The contribution of corn to the early success of pioneer industry cannot, therefore, be overestimated."

237. López de Cogolludo, Diego. Historia de Yucatan; escrita en el siglo XVII. Ed. 3, 2v. Merida, Impr. de M. Aldana Rivas, 1867-68. Libr. Cong. F1376.L87
First pub., Madrid, 1688, ed. by Francisco de Ayeta.
In Book 4, Ch. 3 of his pre-Columbian history of the Maya the author states that there were no bargains in food because there was always one fixed price except in the case of maize the price of which was wont to go up when there was a poor harvest.

238. López Tuero, Fernando. Cultivos perfeccionados: maiz y tabaco. 70pp. Puerto Rico, Impr. de Acosta, 1890. Libr. Cong. SB185.L86
Writing of the fabulous proportions to which the cultivation of maize is carried in America the author states that perhaps the best maize in the world is produced in Venezuela.

239. López y Parra, Rodrigo. El teozinte. Origen del maíz. 20pp. México, Imprenta y Fototipia de la Secretaría de fomento, 1908. 59 L88
Discusses various opinions on the origin of maize, as to whether it is generically a distinct plant or the result of the crossing of teosinte with another plant.

240. Lord, Russell. Men of earth. 298pp. London, New York, Toronto, Longmans, Green and co., 1931. 119 L88
The first chapter, Farmers of the Background, is in two parts, the second of which (pp. 13-23) is on corn. Most of the discussion deals

with the life and agricultural practices of the Iroquois Indians who, according to the writer, have left the imprint of their native technique upon even "the most mechanized and complex of our American farms today."

"They were Indians who farmed more than they hunted. Their great crop was corn...the giant grass of prairies, the grain that gives a special savor, particularly, to all that comes out of our middle acres, the Corn Belt.

"Corn saved many a devout Pilgrim, many a Dutch burgher on the Hudson, many a follower of Penn, from starving to death. The early settlers grew it because they saw the Indians growing it, and living; and they grew it as the Indians did, in hills, and fattened the grain with fish and clam shells, as they saw the Indians do. The one distinctive native grain of America, the mainstay of its primitive agriculture, maize worked over very rapidly after the white invasion into the place it still holds in our national economy. It is the keystone in the distinctive structure of our farming today. The way in which it must be grown, the way in which other crops are fitted around it, and the growth of the immense corn-fed livestock industries of our midwest combine to cast the greater part of our agriculture into a pattern that is in no way European but entirely of this soil, our own." - p. 14.

241. Lundell, Cyrus Longworth. The agriculture of Maya. [1933?] (Paper 445, the Department of Botany and Herbarium, University of Michigan) 30.9 L Pam. Coll.

Reprinted from Southwest Rev. v. 19, no. 1, 1933, pp. 65-77. (Libr. Cong. AP2.S883)

Tells of a visit made in the autumn of 1931 to the Maya village of Chan Laguna during the course of explorations in southern and southwestern Campeche. "Of its nine families, eight live on the products of their agricultural clearings... The primitive milpa system of agriculture, as found in Chan Laguna, is effective where there is a limited population. Everything is taken from the soil, and nothing returned, so that the system is by its nature destructive. The Indian goes from his village into the nearest high forest and chooses a fertile spot where his corn will grow. He fells the bush (secondary and primary forest) during the dry months of February, March, and April; lets it dry; and then late in May, before the rains begin, burns the area... As soon as the first rain falls, sometimes in April but more often late in May, the Indian takes a sharp-pointed stick and his seed corn, and plants his milpa...

"In October and November the milpa crops are harvested and stored. During the harvesting the corn is placed in temporary thatched sheds, but afterwards it is removed to the owner's house in the village. The agricultural Indian then takes a long rest. At the beginning of the next dry season, he will return to the same clearing and cut down the year's growth of vegetation, and in May burn it. The ashes are the

only fertilizer the soil receives...either the third or fourth year the clearing is ordinarily abandoned and another site is chosen. The temporarily abandoned milpa is often placed in cultivation several times." At last the land becomes too poor to repay planting and new land must be sought farther and farther away from the village.

"It may be safely stated that in general all the modern Maya employ the same system of agriculture as is found at Chan Laguna." It is suggested that "many of the ancient Maya probably had a more highly developed agricultural system than the present milpa type," which has survived among the few remaining Maya because it is the easiest system.

242. Lundy, John P. Zea maize, as it relates to the incipient civilization of red men all the world over. Numismatic and Antiquarian Society of Phila. Proc. in celebration of the Twenty-fifth anniversary of its foundation, January 1, 1858, held Thursday evening, January 4, 1883, pp. 15-22. Philadelphia, 1883. Libr. Cong. CJ15.N7

The writer's argument is that all civilization or settled life begins with agriculture, that all historical civilization began within or near the tropics in both hemispheres, that maize of some kind was the first farinaceous food of primitive man after the discovery of fire to cook it, and that Indian corn is native to the Eastern Hemisphere.

243. MacCauley, Clay. Seminole Indians of Florida. Smithsn. Inst. Bur. Ethnol. Ann. Rpt. (1883-84)5: 477-531. Washington, D. C., 1887. 500 Sm63 v. 5

Ch. III describes the tribal life of the Seminoles, including their industries, prominent among which is agriculture. A paragraph on p. 510 is devoted to corn, the chief product of their agriculture.

On pp. 522-523 there is a brief account of the festival of the "Green corn dance" which annually precedes the first feast on green corn.

244. MacClary, John Stewart. The first American farmers. Art and Archaeol. 24(3): 83-88. Sept. 1927. Libr. Cong. N1.A35

In this article on the Basket-Makers, the writer frequently refers to their use of corn, remnants of which had been stored in their hiding places more than 2000 years ago. He describes the methods of water conservation, without which no corn fields would have flourished in the desert canyons, and sketches the process of basket making for storing of corn.

245. Macedo, Dr. [Paper on the aborigines of Peru, their history and customs] Numismatic and Antiquarian Soc. Phila. Rpt. Proc. 1883: 11-18. Philadelphia, 1884. Libr. Cong. CJ15.N7

"The Indian corn, potatoes, wheat, beans, hulluco, quinua and havas were the principal productions. From the corn or Sara, the Indians made and still continue to make a sort of fermented liquor, Acca, which was greatly esteemed by the Incas. From the same grain they made the bread for the feasts of Ragmy, whom they called Zancu; it was kneaded by the Virgins consecrated to the Sun." - p. 14.

246. McNair, James B. Indian corn. Field Mus. Natl. Hist. Dept. Botany. Leaflet 14, 33pp. Chicago, 1930. 500 C432L no. 14

The bulletin is divided into 3 sections: Origin, Geographic Distribution and Varieties; Use by the American Indian; Modern Industrial and Experimental Products. In the first section, the writer points out the antiquity and importance of corn to the early inhabitants of this continent.

"As corn was one of the chief foods of the Indians, it is not strange that it played a decorative part in their pottery and sculpture. It also played a part in their religion and so is found the corn altar of the American Indian - the six-direction altar... Corn was used in many other ceremonies. The Aztec god of agriculture is sometimes represented with a stalk of corn in one hand. Centeotl was the Ceres of the Aztecs, their goddess of corn. The Mayas and Peruvians also made extensive use of corn in their festivities.

"Corn is the outstanding crop of the United States both as to value and acreage. In both value and area it exceeds the combined crops of wheat, oats, rye, barley, buckwheat, rice, fruits, and nuts. Since the first official registration in the United States, in 1840, corn has led all other cereals in importance, and since 1865 there has been a noticeable increase in production in proportion to the population." - p. 5.

"Although the Indians realized the substantial way that corn supplied some of their essential needs, yet their keenest sense of pleasure came from the drinks that it afforded. They had a great many of these... Probably the most commonly used fermented drink was chicha, which was widely known in many forms." - p. 18.

"The Indians commonly wasted the stalks, leaves, and husks except for a limited use in mats, beds, thatching, and fuel. In Mexico and parts of South America the large, outer husks were and are still used for wrapping tamales for cooking. The thin inner husks were used for cigarette paper." - p. 14.

In his third section, the writer discusses the many uses for corn in our modern civilization. "Like the Indian, the white man still makes meal from the corn kernels, but many other substances are also manufactured from it, such as starch, dextrine, glucose, sugar, oil, and solvents. From the cobs, pipes, xylose, sugar, and other articles can be made, while from the stalks, cane sugar, wall board, paper, artificial silk, and numerous other articles are manufactured." - p. 19.

247. McOmie, A. M. Dry-farming in Arizona, by A. M. McOmie assisted by C. R. Fillerup and L. L. Bates. Edited and revised by H. C. Heard. Ariz. Agr. Expt. Sta. Bul. 84, pp. 499-642. Tucson, 1918.

Indian agriculture in Arizona, pp. 530-537. "The principal crops of the Hopis are corn and beans; and, like the Pimas and Papagoes, they have contributed several important varieties for dry-farming, including Hopi Lima, White Hopi, and Bates' beans, and White Hopi and Blue Hopi Corn." - pp. 532-533.

Farming by early white settlers, pp. 537-539. Most of the early settlers raised corn. "Captain Weaver, a hunter and traveller along the Hassayampa River cultivated a little garden patch about 1830, probably the first crop planted in Arizona by an American. His garden included melons, corn, and beans, the latter two being varieties which he secured from Indians."

248. Maize. Independent 70(3265): 1433-1435. June 29, 1911. Libr. Cong. AP2.I53

An evaluation of corn and a sketch of its history in America are given in this editorial.

"The pioneer colonists soon learned how to prepare this new grain for food and without it they could never have made their passage westward thru the wilderness. It needed only to drop the kernels in the virgin soil, with beans and pumpkins, and a garden in the wilderness was a prompt result. With meat from the forest and fish from the streams, corn, beans and squash made excellent diet. All our progress in agriculture has not carried us away from this staple grain. America, with its three million bushels of corn annually, is the present milestone sure to be advanced from with great rapidity - but corn it is to the end. In other words, humanity has not been able at any point to achieve a greater mastery over vegetable life than the production of maize. It is hard to estimate the debt we owe to the Indian for having begun this magnificent development. It is thought by later historians that if the whites had not reached this country for another hundred years, corn would have created a new style of social and political life among the aborigines. It would have weaned the nomads from their unsettled life. Indeed it was already doing this in the case of the Iroquois of the North and the Seminoles of the South." - p. 1434.

249. Mangelsdorf, P. C., and Reeves, R. G. The origin of Indian corn and its relatives. Tex. Agr. Expt. Sta. Bul. 574, 315pp. College Station, 1939.

Literature cited, pp. 308-315.

Maize in relation to culture and civilization, pp. 273-302. Subtopics of this section are: Arrival of man in America; ancient cultures and civilizations (the Andean and the Middle American civilizations, and other cultures); maize, agriculture, and the archaic culture (the origin of American agriculture, primitive agriculture in South American lowlands, geographical features in relation to domestication, possibility of an early indigenous agriculture in Middle America, the spread of maize and agriculture).

250. Markham, Sir Clements R., ed. Expeditions into the valley of the Amazons, 1539, 1540, 1639. Tr. and ed. with notes, by Clements R. Markham. 190pp. London, Printed for the Hakluyt Society, 1859. Libr. Cong. G161.H2

References to maize are found in The Voyage of Francisco de Orellana down the River of the Amazons, A. D. 1540-41, by Antonio de Herrera. "Having embarked a good supply of the biscuit which the

Indians make from maize, yucas, and fruit, they set sail." - p. 30.

"The Spaniards found a supply of maize, turtles, turkeys, and parrots." - p. 32.

See also A New Discovery of... The Amazons, by Father Cristoval de Acuña...1639, from the Province of Quito, in the Kingdom of Peru.

"It is by the harvests that we usually register the difference between winter and summer in those parts of Peru which experience various temperatures... These harvests occur twice in the year on this river, not only as to maize, one of the principal articles of food, but also as to all other seeds proper to the country." - p. 73.

Speaking of the "famous river which the Indians call Cuchiguará," the author notes the presence of "abundance of maize and mandioc." - p. 107.

251. Markham, Sir Clements R. A history of Peru. 556pp. Chicago, C. H. Sergel and co., 1892. (Latin-American Republics) Libr. Cong. F3431.M34

"The evidence is now conclusive that man has existed on the American continent, from the Delaware to the river Plate, since the glacial epoch... The most ancient human vestige that has been found in Peru is the mummy which was dug up in the province of Tarapaca, in the year 1874. It was beneath the volcanic formation called chuco, which is itself of vast antiquity. With the body there were cotton twine, a woven bag, and some cobs of maize. Indeed the perfection to which the cultivation of maize and potatoes had been brought by the Peruvians, and their domestication of the llama and alpaca are convincing proofs of the remote antiquity of their civilization. De Candolle tells us that maize is unknown in a wild state, and many centuries must have elapsed before the natives of the Andes could have produced numerous cultivated varieties of maize and potato, and have completely domesticated their beast of burden and their fleece-bearing alpaca. During cycles of centuries the natives of the Andean region were slowly advancing toward the highest type of civilization of which their race is capable." - p. 17.

"Maize...is the cereal of the Incas; and Cuzco maize surpasses all other kinds in size and in yield. The Incas made it into bread, cakes, puddings, fritters, and the fermented liquor from it, called acca in ancient times, is now universally drunk by the Indians and called chicha. The stalks of the Cuzco maize grow to a height of fifteen feet, and the grains are four or five times the size of ordinary maize grains. They are white, red and yellow, red, yellow, and purple. Perhaps the finest crops are to be seen in the valley of Yucay near Cuzco, through which flows the river Vilcamayu, where the climate is like that of Italy or the south of France. The stalks, which are exceedingly rich in sweet juice, make excellent food for cattle." - p. 500.

252. Markham, Sir Clements R. The Inca civilization in Peru. In Winsor, Justin, ed. Narrative and critical history of America, v. 1, pp. 209-282. Boston and New York, Houghton Mifflin co., 1889. Libr. Cong. E18.W76 v. 1

"The nature of the country and climate was a potent agent in forming the character of the people, and in enabling them to make advances in

civilization... It is on the lofty plateaux of the Andes, where extensive tracts of land are adapted for tillage, or in the comparatively temperate valleys of the western coast, that we find nations advanced in civilization...

"One strong piece of evidence pointing to the great length of time during which the Inca nations had been a settled and partially civilized race, is to be found in the plants that had been brought under cultivation, and in the animals that had been domesticated. Maize is unknown in a wild state, and many centuries must have elapsed before the Peruvians could have produced numerous cultivated varieties, and have brought the plant to such a high state of perfection."

Reference is made to earlier dynasties than that of the Incas. Among them "the Piruas governed a vast empire... They also, in a long course of years, brought wild plants under cultivation... But it is remarkable that the shores of Lake Titicaca, which are almost treeless, and where corn will not ripen, should have been chosen as the centre of this most ancient civilization."

Among the festivals of the Incas was that of Situa celebrated at the vernal equinox which was the beginning of the rainy season when sickness prevailed. "At night, each family partook of a supper consisting of pudding made of coarsely ground maize, called sancu, which was also smeared over their faces and the lintels of their doorways, then washed off and thrown into the rivers with the cry, 'May we be free from sickness, and may no maladies enter our houses!'... Every household had one or more lares, called Conopa, representing maize, fruit, a llama, or other object on which its welfare depended...

"The white maize of Cuzco has never been approached in size or in yield."

253. Markham, Sir Clements R. Travels in Peru and India while superintending the collection of chincona plants and seeds in South America, and their introduction into India. 572pp. London, J. Murray, 1862. Libr. Cong. G480.M4

In Ch. XIII, Caravaya - The Valley of Sandia we read: "Three leagues from Cuyo-Cuyo is the confluence of the torrent of Ñacorequi with the river of Sandia; and after this point maize begins to be cultivated, where the craggy jutting cliffs permit, between the river and the mountains. The Indians live in eyrie-like huts, perched at great heights, here and there, amongst the maize terraces." - p. 219.

"The Indians of the district of Sandia are divided into six ayllus or tribes... These ayllus are established on the mountains around Sandia, living in scattered huts, some cultivating maize and potatoes, others raising barley and alfalfa for mules." - p. 221.

"After wading across the rapid little river of Llami-llami, which enters the Tambopata on the left bank, we came to a small clearing... the property of a very energetic and obliging old Bolivian, named Don Juan de la Cruz Gironda... This little farm was the extreme outpost of civilisation in this direction, and had only been commenced since December 1859. Gironda was cultivating sugar-cane, maize, and edible

roots; and, at the time of my visit, he was just commencing his michca, or small sowing of maize. His people were driving holes in the ground with long poles, about a foot deep, into which they drop four to six grains, and cover over. The holes are four feet apart, for here the maize grows to an immense height." The method of sowing and reaping is described. - p. 244.

"The lofty table-lands of the cordillera of the Andes produce sufficient maize, wheat, and sugar for home consumption." - p. 303.

254. Martínez del Río, Pablo. La domesticación del maíz, y el problema de la antigüedad del hombre en América. Universidad de la Habana 4(22): 38-48. Jan.-Feb. 1939. Pan Amer. Union Libr.

A survey of the views of various botanists and archaeologists on the origin of maize and its antiquity.

255. Mason, Gregory. Columbus came late. 341pp. New York, London, Century co. [1931] Libr. Cong. E61.M39

Bibliography, pp. 329-334.

Americans do not properly esteem the cultural antiquity of the New World, but have instead a "hemispheric inferiority complex" in this writer's opinion. Much of his book is devoted to describing the civilizations and cultures that flourished in the Americas many centuries ago. Ch. III, Mother Maize, pp. 33-45, contains a discussion on the importance of corn in aboriginal agriculture.

"Of all the evidence indicating the great antiquity of human culture in America and its complete independence of culture in Asia, Africa, and Europe, the most significant is American agriculture, and the most picturesque single bit is an ear of corn... Botanists have pointed out that ancient Americans had an agriculture based on food-plants that did not grow outside of America before Columbus crossed the Atlantic... But the basic plants of this prehistoric American horticulture were corn, beans, and squashes... And the most important of these three was corn, or maize, to give it its proper native name." - pp. 33-34.

In referring to the wide diffusion of maize in America, the author says: "It was the food of the primitive 'Basket-maker' who lived in caves and cliff-dwellings in New Mexico and Arizona, and it was the basis of the diet of the man of the 'Archaic' culture who from Mexico into South America has left crude pottery remains of a unified type. It was the food of the laborers who built the roads and the stone walls of South America, and of the workmen who constructed the lovely limestone palaces and temples of Central America. A surplus of maize gave the necessary leisure for artists to create the beautiful tapestries and pottery of Peru, and for scientists to build up the astonishing knowledge of mathematics which was current in Guatemala and Yucatan when Romans were tyring to civilize the barbarians of western Continental Europe and Great Britain. Far more than any other food, maize supported the great population America had before the coming of the white man... Maize saved the first white men who settled in America. The Pilgrims in New England had the common sense to put their settlements in the cleared fields left by red-skinned agriculturists." - pp. 43-44.

256. Mason, Gregory. Native American food. What the Indians gave us to eat and how their discoveries influenced the dietary habits of the world. Amer. Mus. Nat. Hist. Nat. Hist. 37: 309-318. Apr. 1936. 500 N483J

About one-half page of this discussion is devoted to maize. The writer points out that only recently has the Indian received credit for his contributions, and that maize was the red man's greatest gift to world agriculture. We have borrowed from the Indian several varieties of maize as well as his methods of cultivating it, and even have developed corn husking ceremonies whose antecedents probably were the religious ceremonies at planting and harvest time.

257. Matthews, Washington. Ethnography and philology of the Hidatsa Indians. U. S. Dept. Int. U. S. Geol. and Geogr. Survey. Misc. Pub. 7, 239pp. Washington, D. C., 1877. 407 G292M

Ethnography, pp. 1-72. The first thirty-two pages deal with the Indian village at Fort Berthold, Dakota Territory. Their corn-scaffolds, or drying frames, and caches for storing grain are described on pp. 8-9. Farming methods are described on pp. 11-12. "The Hidatsas claim to have had no knowledge of corn until they first ate it from the trenchers of the Mandans; and they have no important ceremonies connected with the harvesting, yet they cultivated it long before the advent of the white man. In favorable years they had good harvests, and were able to sell corn to other Indians and to their traders, besides keeping all they wanted for their own use."

258. Maudslay, Anne Cary, and Maudslay, Alfred Percival. A glimpse at Guatemala and some notes on the ancient monuments of Central America. 289pp. London, John Murray, 1899. Libr. Cong. F1464.M44

On p. 44 reference is made to the custom of clearing out trees preparatory to planting corn. "It seems as though within a few years all the fine timber will have disappeared from the lake region unless some better mode of cultivation is introduced. At present the Indians merely scratch the surface of the ground with a hoe, or, on the level plains, with a primitive wooden plough, and they abandon a plantation after a few crops have been taken off of it. In the Altos, where the population is large, the cultivators have to return to their fallows after a short interval, but wherever there is woodland near at hand they attack it recklessly, sacrificing all the timber trees without scruple. This system of shifting their cornfields has received the sanction of immemorial usage."

259. Meade, Charles W. Indian corn or maize. Amer. Mus. Nat. Hist. Nat. Hist. 21(4): 409-413. July-Aug. 1921. 500 N483J

The article contains brief descriptions of the Indian methods of growing corn, and more about its milling and cookery, including several recipes. The author points out that corn is one of the agricultural products contributed to the world by the Americas. This final paragraph is quoted from p. 413:

"It is the testimony of the Pilgrim Fathers and those in the plantations in Maryland and Virginia that without maize their settlements

would have ended in melancholy tragedies. Time and again corn supplied by their Indian neighbors saved them from starvation."

260. Means, Philip Ainsworth. Ancient civilizations of the Andes. 586pp. New York, London, C. Scribner's sons, 1931. Libr. Cong. F2229.M49

"The Andean area may for purposes of this volume, be defined as including the republics of Ecuador, Peru, and Bolivia, together with adjacent portions of Colombia, Argentina, and Chile." - p. 3.

In Ch. VIII on the economic, governmental, and social aspects of Incaic civilization the diet of the masses is said to be largely composed of jerked meat supplemented by maize and potatoes, with three kinds of bread all made from maize. The national drink was maize beer. - pp. 309-310.

"Markets...were general and frequent under the Incaic régime." Maize was often used as money in Peru. "No value nor standard was fixed in these exchanges by any public authority, for this was left to the satisfaction of the parties." A description is given of a business transaction between two women one of whom buys fruit or some kind of food with maize instead of money, the whole transaction being carried on in silence.

261. Merrill, Elmer D. Crops and civilizations; cultivated plants and the origins of civilizations. Amer. Mus. Nat. Hist. Nat. Hist. 33(3): 235-250. May-June 1933. 500 N483J

The writer's purpose in this article has been to demonstrate the relationship between the places of origin of cultivated plants and those of ancient civilizations. There are scattered statements relating to maize. "In each ancient center certain definite food plants and animals were basic; thus in Mexico maize was the most important single food, while in Bolivia, Ecuador, and Peru, the potato held place." - p. 239. "In contrast to numerous cultivated cereals in the Old World, America produced but one, though this was the highly important maize or Indian corn." - p. 241.

262. Messedaglia, Luigi. Il mais e la vita rurale italiana, saggio di storia agraria. 446pp. Piacenza, Federazione italiana dui consorzi agrari, 1927. 59 M562M

Chs. II-V deal with the origin of maize in America where it is said to be indigenous and to have existed long before Columbus found it and took it to Spain. Other theories are discussed and the names of maize in various languages are noted.

263. Miller, George J., and Parkins, Almon E. Geography of North America. Ed. 2, largely rewritten and reset, xviii, 632pp. New York, J. Wiley & sons, inc.; London, Chapman & Hall, ltd., 1934. 278.11 M61 Ed.2

Selected list of reference material, pp. vii-xvi.

See p. 229 for a paragraph on the Primacy of the Corn Crop, and pp. 232-233 for two paragraphs on the Importance of Corn.

264. Millspaugh, Charles S. Indian corn. In The making of America; ed. by Robert Marion La Follette, v. 5, pp. 158-165. Philadelphia, J. D. Morris & co. [1905] Libr. Cong. HC103.L2

Published originally in the Chautauquan, v. 31, no. 4, July 1900, pp. 338-343.

An account of the origin and spread of corn. "No product of the soil bore a more important relation to the welfare of the early American colonists, or provoked a deeper interest in the new world and its agricultural possibilities, than maize or Indian corn. Next to gold itself the golden grain excited the cupidity of the early explorers and settlers, and its confiscation and destruction by them tended to embitter the aborigines against the paleface who was showing a constantly increasing tendency to invade their domains along the eastern coast." - p. 158.

"Thorwald, brother of Lief saw wooden cribs for corn upon the Mingan islands A. D. 1002." - p. 160. Karlsefn, Thorfin, Columbus, Magellan, Cabecca de Vaca, De Soto, Champlain, Hudson, and Standish all reported seeing corn or eating it.

265. Mitchell, James Leslie. The conquest of the Maya. With a foreword by Professor G. Elliot Smith. 279pp. London, Jarrolds, ltd., 1934. Libr. Cong. F1435.M68

"Maize in America was obviously taken and cultivated by the nameless immigrants after much scrutiny and searching of the wild grasses of the new continent. It did not grow wild in California or North Mexico: its home was the Mexican plateau or Central America... Lack of a cultivable food-plant retarded and probably killed the direct Asian-brought Archaic culture in the north. In the south it was quite otherwise. Maize was cultivated, albeit sparsely and inefficiently: settlements, as that of Coyoacan, were reared: the wandering groupings of hunters and fishers were tamed to the half-practice of agriculture in the course of another five hundred years." - pp. 53-54.

The method of cultivating maize in Yucatán at the time of the arrival of the Spaniards is described on pp. 93-96.

266. Molina, Christóval de. The fables and rites of the Yncas. Translated... and edited, with notes and an introduction, by Clements R. Markham. London, Printed for the Hakluyt society, 1873. (Works issued by the Hakluyt society, [no. XLVIII], pp. 3-64) Libr. Cong. G161.H2

An account is given of the harvest held in April. "Those who had received arms as knights went to the farm of Sansiru, to fetch the maize that had been reaped there, which is beneath the citadel. It is here they say that Mama-huaca, the sister of Manco Ccapac, sowed the first maize. They cultivated this farm every year, for the body of this Mama-huaca, making from the crop the chicha that was necessary for the service of the body, and delivering this chicha to those who had charge of the body, which was embalmed." The bringing in of the maize is further described, after which "they went back to their farms." - p. 52.

267. Montgomery, Edward Girrard. The corn crops; a discussion of maize, kafirs, and sorghums as grown in the United States and Canada. Rev. ed., 347pp. New York, The Macmillan co., 1920. (The Rural text-book series, ed. by L. H. Bailey) 59 M76

References at end of most of the chapters.

Pt. I of this textbook deals with corn and Pt. II with sorghums. The first part is divided into four sections, namely: I. The Corn Plant, II. Production as Related to Climate and Soils, III. Improvement and Adaptation of the Corn Plant, and Environment, IV. Cultural Methods.

In the chapter on Early Culture of Corn, the writer states that it was the principal crop cultivated by the natives in North and South America and that specimens of corn have been found in Peru in ruins that are at least two or three thousand years old. "The fact that corn was buried in the tombs, as well as other evidence, indicates that it had an important place in the religious ceremonies of this semicivilized people and was probably their most important cultivated plant." - p. 77.

"When the first white settlers came to America, at Jamestown (1607) and Plymouth (1620), they at once took up the culture of corn, procuring the seed and learning the method of culture from Indians. It soon became the most important cereal crop of the colonists, gaining its popularity by reason of its simple culture, its sure production, and the ease with which the crop was harvested and preserved." - p. 78.

268. Mood, Fulmer. John Winthrop, jr., on Indian corn; with text. New Eng. Quart. 10(1): 121-133. Mar. 1937. Libr. Cong. Fl.N62

"The essay is here published in full for the first time. An abbreviated text was brought out in an issue of the Philosophical Transactions in 1678... To students of our cuisine no less than to those interested in agriculture, the essay will be of value. It may serve too as a specimen of the descriptive or scientific prose of the age, and...it is informed throughout by a sincere appreciation of the importance of corn in colonial economy that lends to it a modest degree of charm, if not of distinction." - pp. 124-125.

269. Moore, J. R. H. An industrial history of the American people. 496pp. New York, The Macmillan co., 1917. 277 M78

This is a textbook written for high school use. Ch. VI, pp. 131-162, is on agriculture.

Corn as a food for the early colonists is discussed on pp. 135-143, 145, 149. In telling briefly of the different ways of cooking corn and corn meal the author states, on p. 139, that "This shows that our forefathers had discovered early in colonial days that corn was one of nature's best foods, and evidently they regarded it as the mainstay of life in the new land."

270. Morley, Sylvanus Griswold. Guide book to the ruins of Quirigua. 205pp. Carnegie institution of Washington, Washington, D. C., 1935. (Carnegie Instutition of Washington. Sup. Pub. no. 16) Libr. Cong. F1435.1.Q8M67

"About twenty-five hundred years ago there lived in what is now the northern part of the Republic of Guatemala groups of Indians who practised agriculture as their chief means of support...their chief crop was Indian corn, or maize. This was, literally, their staff of life since it probably constituted no less than four-fifths of their diet. Their system of agriculture was simplicity itself." A description is given of the "so-called milpa system of agriculture, practised throughout the American wet tropics even to the present day and so far as any evidence to the contrary is concerned...it would seem to have been the only system known to the ancient Maya." - pp. 17-19.

A section deals with the probable origin of corn. "Perhaps as early as the second millenium before the beginning of the Christian Era, almost certainly prior to 1000 B.C., knowledge of this precious cereal, which was to change man's habits and mode of living on the American Continent so fundamentally, began to work down the valleys from the plateau region of southern Guatemala to the Atlantic coastplain. Gradually this knowledge reached the Maya of that remote day living in small groups scattered through the great forests of northern Guatemala (the Department of Petén) and transformed them from nomads, dependent upon hunting and fishing supplemented by wild fruits, nuts, grasses and roots, to primitive farmers with fixed homes." - p. 20.

"By the beginning of the Great Period (...approximately A.D. 731) the moment was ripe for an extraordinary esthetic florescence. Doubtless for many centuries the lower Motagua Valley, because of its exceeding fertility, had been occupied by groups of maize-growing peoples awaiting only adequate leadership to organize and achieve." - p. 29.

The author believes that the principal cause of the decline and fall of the Old Maya Empire was an agricultural and economic collapse due to the "temporary unavailability of the land caused by the milpa system of agriculture...

"The replacing of the original forests by man-made savannas, thus marking the end of cultivability so far as ancient Maya agricultural methods were concerned, must have come about gradually, reaching a really acute stage at different cities at different times, depending in each case upon such variable factors as their relative sizes and ages, and the fertility of the surrounding areas.

"The point at which complete abandonment and migration elsewhere came to be generally recognized as the remaining solution for their desperate economic situation, must, in the very nature of the case, have been reached at different times in the different cities, giving rise to different closing dates in each, the extremes covering about a century, thus conforming better than any of the other hypotheses suggested with the known archaeological facts." - pp. 37-38.

271. Morley, Sylvanus Griswold. Unearthing America's ancient history. Investigation suggests that the Maya may have designed the first astronomical observatory in the New World in order to cultivate corn. Natl. Geog. Mag. 60(1): 99-126. July 1931. 470 N213

A picture of Maya civilization is presented, including their architecture, cultural attainments, pottery, astronomical observatory, agriculture, etc. In regard to corn and its place in this Maya culture the author writes:

"The agricultural foundation of our native American civilizations is now an accepted archeologic fact. Just as rice is the food staple of Asia, and wheat of Europe, so in ancient times Indian corn, the Zea Mays of botany, was the food staple of America - indeed, among the Indian races it still continues to be the staff of life. Hence, where corn was first cultivated, there flourished our first high native civilization." - p. 100.

"All things considered, it is not improbable that the priceless cereal which was to change so fundamentally the conditions of living in the two Americas, which was to make possible the growth of our great indigenous empires - the Inca, the Maya, the Toltec, and the Aztec - was developed somewhere in the highlands of central Mexico, from an accidental cross between teosinte and some as yet unidentified wild grass, some time during the last ten thousand years. Once this discovery had been made, the panorama of human activity began to change rapidly. Before the advent of corn man had been a hunter and a fisherman, living by the chance supply of game and fish from forest and stream, eked out by such wild fruits, berries, roots, and nuts as experience, the well-known process of trial and error, had proved would not injure him...

"After the development of corn, however, a vast change in living conditions, gradually came about. Agriculture demanded fixed abodes. Fields had to be cleared for planting, to be sowed and kept weeded, and finally the crops had to be harvested. More and more time was devoted to agriculture and less to moving about. Homes had to be maintained in the immediate vicinity of the tillable lands. Man ceased to be a wanderer and at last settled down to live in fixed places, which, as time went by, grew larger and larger." - pp. 104-105.

"Because the Maya were primarily agriculturists and because the civilization they were developing was founded on the cultivation of corn, the priests very early turned their attention to the measurement of time in its various manifestations. How long was the year? How long the waxing and waning of the moon? How long shone the morning star in the west? Astronomy, or, better, astrology, became their chief concern, and the recording of its principal phenomena their most important occupation." - p. 108.

272. Morley, Sylvanus Griswold. Yucatán, home of the gifted Maya. 2000 years of history reach back to early American temple builders, corn cultivators, and pioneers in mathematics. Natl. Geog. Mag. 70: 590-644. Nov. 1936. 470 N213

Numerous photographs and illustrations compose the bulk of this article, which is of a general descriptive character. The importance of corn is brought out on p. 597, where the writer states: "The Maya civilization, being founded upon corn, the increasing production of

this Maya staff of life, due in no small part to the excellent service of their local weather bureau officials, the astronomer-priests, made possible the accumulation of food reserves. The growing wealth meant more and more time off from the imperative routine of keeping body and soul together, so that an increasing number of people were able to turn their leisure time to other pursuits, such as architecture, art, sculpture, painting, ceramics, jade engraving, weaving and feather-working, all of which crafts were highly esteemed by the ancient Maya."

After describing this highest civilization ever achieved by the American Indian, the writer points out the reasons for its collapse and downfall. The milpa (named after the Aztec word for cornfield) system of agriculture as practiced by the Maya, eventually brought into operation the law of diminishing returns. In ancient times, the greater part of the land was probably lying fallow until the forest grew again and could be cleared and burned. In time, these repeated burnings retarded the process of reforestation until only grass grew on the abandoned clearings because the soil had been exhausted. When this stage was reached, Maya agriculture was at an end.

273. Myrick, Herbert, ed. The book of corn; a complete treatise upon the culture, marketing and uses of maize in America and elsewhere. 368pp. New York, Chicago, O. Judd co. [1903] 59 M99B

Ch. I, Brief History of the Corn Plant, pp. 1-4, tells of the prevalence of corn culture in America, as attested by the journals and writings of the early travellers and explorers.

274. Nettels, Curtis Putnam. The roots of American civilization; a history of American colonial life. 748pp. New York, F. S. Crofts & co., 1938. Libr. Cong. E188.N48

Bibliographical footnotes.

Pages 229-237 are devoted to Colonial Agriculture. On p. 230 the writer tells why corn was the ideal initial crop of the early settlers and states that American agriculture from Maine to Carolina was given its start by Indian corn.

275. Newberry, J. S. Food and fiber plants of the North American Indians. Pop. Sci. Monthly 32: 31-46. Nov. 1887. 470 P81

One page (32) of the article is given to maize or Indian corn, about which the author writes:

"Maize...seems to have been the most widely diffused and most important of all the kinds of vegetable food employed by the native population. In all parts of North and South America, where the climate was favorable, the whites found corn cultivated by the aborigines, and in the tombs of Peru as well as in the mounds of the mound-builders, ears of corn have been discovered, which prove that it was an important element of subsistence as far back as human records extend."

276. New Mexico. University. Symposium on prehistoric agriculture. N. Mex. Univ. Bul. 296 (Anthrop. Ser. v. 1, no. 5) 72pp. Albuquerque, 1936. 30.9 N462

These papers were presented at the sixteenth annual meeting of the Southwestern Division of the American Association for the Advancement of Science, held at Flagstaff, Arizona, Apr. 27 to 30, 1936. Among the discussions of interest are the following:

The Origin of the Maize Plant and Maize Agriculture in Ancient America, by Paul Weatherwax, pp. 11-18. (Although the paper is primarily a consideration of the origin and domestication of the maize plant, the opening paragraph is of particular interest and is quoted in full, p. 11: "There is no reasonable doubt that the grades of civilization reached by the various early races in America were closely correlated with the success with which they cultivated maize. The utilization of this plant usually meant more or less fixed habitations, a comparatively easy living, and an impressive reward for the application of intelligence. No other food plant approached it in significance, and no other cereal known anywhere on earth could have served as well on a continent which had no domesticable draft animals. Although it has since proved adaptable to mechanized treatment, it has always been the ideal cereal for hand cultivation.")

Maize as a Measure of Indian Skill, by James H. Kempton, pp. 19-28 (This paper is a consideration of the origin and spread of corn culture. "Civilizations, like armies, progress on their stomachs. Without an assured supply of food neither can advance... The history of civilization, therefore, is the history of agriculture... All of the higher civilizations are founded on grasses. The Old World cultures were reared on barley, wheat or rice. In the New World the time for constructive thought and the flowering of the arts was obtained from the development of that remarkable cereal - maize. Whether the American Indian was a more skillful plantsman or whether he started plant culture before the Old World peoples there can be no question but that he excelled in the art of molding plants to meet his needs and the greatest of his achievements is Indian corn." - pp. 19-20.)

The Utilization of Maize among the Ancient Pueblos, by Katherine Bartlett, pp. 29-34. (The writer presents the methods of preparing corn for food, especially the use of various types of metates and grinding stones for making corn meal.)

277. Nordenskiöld, Erland. The American Indian as inventor. Roy. Anthrop. Inst. Gt. Brit. and Ireland. Jour. 59: 273-309. July-Dec. 1929. Libr. Cong. GN2.A3

"The Huxley Memorial Lecture for 1929."

Bibliography, pp. 307-309.

Partially reprinted in Kroeber, A. L., and Waterman, T. T. Source book in anthropology, pp. 489-505. (Libr. Cong. GN4.K7)

On p. 275 the writer calls attention to the inventions of the Indian in connection with maize-grinding stones, graters, husking pins, etc., recipes for cooking maize, and irrigation systems.

278. Nuttall, Zelia. Documentary evidence concerning wild maize in Mexico. A contribution towards the solution of the problem of the origin of cultivated maize. Jour. Heredity 21(5): 217-220. May 1930. 442.8 Am3
Quotes Boturini's statement about his discovery of wild maize in Mexico.

279. Nuttall, Zelia. The fundamental principles of old and new world civilizations: a comparative research based on a study of the ancient Mexican religious, sociological and calendrical systems. Harvard Univ. Peabody Mus. Archaeol. and Ethnol. Papers v. 2, 602pp. Cambridge, Mass., 1901. Libr. Cong. E51.H337 v. 2; F1219.N97
"During their festival in springtime [in Mexico] the priests went through the streets dancing and singing and carrying a shoot of green maize in one hand and a pot with a handle in the other. In this way they went asking for the [ceremonial] boiled maize and all farmers gave them some"...(Sahagun, bk. 6, ch. 5) - p. 78.
"It is...reasonable to infer that the region of the high plateau and valley of Mexico, possibly before the formation of the great lagoons, was the cradle of ancient American civilization, where, during countless centuries, the native race literally and figuratively cultivated its own maize and simultaneously developed the set of ideas which formed the basis of its intellectual evolution.
"In this connection it is interesting to reflect that, as clearly shown by ceremonial usages which existed throughout our continent and survive to the present day amongst the Pueblo Indians, it is to the fostering care, forethought and labor of countless generations of women, the 'Corn Maidens and Mothers,' that America owes the priceless legacy of a food-plant which has already sustained untold millions of lives." - p. 276.
For other references to maize consult the index.

280. Oglesby, Richard James. Governor Oglesby's tribute to corn. Maine. Dept. Agr. Bul. 19(2): 31-32. June 1920. 2 M28B
A reprint of an address delivered by Governor Oglesby of Illinois, Sept. 9, 1894, "and recognized as one of the world's finest tributes to corne, the king of money crops."

281. Orozco y Berra, Manuel. Historia antigua y de la conquista de México. Se imprime esta obra á expensas y por orden del supremo gobierno de la República Mexicana. 4v. México, Tip. de G. A. Esteva, 1880. Libr. Cong. F1219.075
In Volume I, pp. 312-316, the author has gathered together the various theories about the origin of maize. He notes that it was not only known and cultivated by the primitive tribes but they used it for food just as it is used today. The stones that were used to grind the maize and prepare bread have been found in excavations which bear evidence of remote antiquity. The various kinds and colors of maize and its uses for food and drink are enumerated.

282. Pallas, Emmanuel. Recherches historiques, chimiques, agricoles et industrielles sur le maïs ou blé de Turquie. 213pp. Paris, Schwartz et Gagnot [etc.] 1837. 59 P17

Ch. I contains a brief historical sketch in which it is noted that maize was used in Chile as money by the Indians.

283. [Palmer, Edward] Food products of the North American Indians. U. S. Commr. Agr. Rpt. 1870: 404-428. 1871. 1 Ag84 1870

Indian corn (Zea mays) is discussed on pp. 419-422.

"If the ancient use of this plant as food by Indians needs verification, evidence is now accessible both from North and South America. The Smithsonian Institution has an ear of corn found deposited in an earthen vessel eleven feet under ground, in a grave with a mummy, near Ariquipe, in Peru. The grains are rather sharp-pointed, small, and slightly indented at the apex, lapping one over the other, in thirteen rows... Corn may be said to be the most universal article of food cultivated by the Indians of New Mexico, Arizona, California, Nevada, and Utah, while the tribes of the Indian territory consider this grain their staff of life. The cultivation of corn has not been acquired by them from others. It is a matter of historical record that, when living in the Southern States, long before the white man set foot in the country, it was cultivated, and by nearly all the Indians of the present United States to a greater or less extent. The Indians who grow it in the primitive manner, and have the original corn of America, are the Pueblos of New Mexico and Arizona. The grains vary in color through shades of pink, blue, and white, and the ears are generally rather small and slender." - pp. 419-420.

The author also describes the various ways in which corn was prepared and cooked for food by several of the Indian tribes, and how it was made into intoxicating drinks.

284. Pan American union. Guatemala. 30pp. Washington, D. C., 1929. (American nation series no. 10) 150.9 Am3 no. 10

Pages 15-19 of the section on Products and Industries are devoted to corn. The tortillas of the native Mexicans and Guatemalans today are practically the same as the corn cakes which entered so largely into the diet of the Mayas centuries ago.

"There is good evidence that Indian corn (maize) was first found in the temperate valleys of old Guatemala. The cultivation of this staple is one of the wealth producing occupations of the country...

"Corn found in the ancient tombs undoubtedly furnished the conquistadores with a welceme ration." - p. 17.

285. Pan American union. Mexico; a general sketch. 389pp. Washington, D. C., 1911. 150.91 M572Me

In ch. IV, Products and Resources, there is a section, p. 89, on Indian corn, in which it is stated that this cereal provides one of the chief articles of food to the common people of Mexico. Maize is indigenous to America and its original habitat was probably Southern

Mexico. The Maya Indians lived in this region and from them the cultivation of maize spread to other areas.

Although corn grown in Mexico is not sufficient in quantity to supply the nation's needs, still its annual value exceeds that of any other natural product.

286. Parker, Arthur C. Iroquois uses of maize and other food plants. N. Y. State Mus. Mus. Bul. 144 (N. Y. State Ed. Dept. Bul. 482), 119pp. Albany, 1911. 500 N48B

List of authorities quoted, pp. 110-113.

"Maize played on important part in Iroquois culture and history. Its cultivation on the large scale to which they carried it necessitated permanent settlements, and it was, therefore, an influential factor in determining and fixing their special type of culture." - pp. 5-6.

Contents of section on maize: Maize or Indian corn in history (origin, importance in early English colonies), early records of corn cultivation, customs of corn cultivation, ceremonial and legendary allusions to corn, varieties of maize used, corn cultivation terminology, utensils for the preparation of corn for food, cooking and eating customs, foods prepared from corn, uses of the corn plant.

287. Parmentier, Antoine Augustin. Le maïs, ou, Blé de Turquie, apprécié sous tous ses rapports. Nouv. éd., rev. et cor. 303pp. Paris, De l'Imprimerie impériale, 1812. 59 P24M

The finding of maize by travellers in Santo Domingo, in the Antilles, Mexico and Peru where it was the basic food of the people is noted. It is said to have been grown in the gardens of the palaces of the Incas, to have been used to prepare the sacrificial bread and a drink for festivals, and to have served as money. In Chile in the gardens of the Incas was found the most beautiful maize. When maize was lacking plants of gold and silver were substituted, providing a marvellous spectacle in the fields.

288. Payne, Edward John. History of the new world called America. 2v. Oxford, Clarendon press, 1892. Libr. Cong. E58.P35

There is an extensive discussion of maize-agriculture and its diffusion from South to Central and North America in volume one of this work. "The substitution of maize for roots was in progress at the Discovery throughout tropical America. In Mexico, though many roots were cultivated, among them the sweet potato and sweet manioc, the universal staff of life was maize: and in Peru maize had been substituted for the potato to the extreme limit within which it will ripen its seeds. Among the tribes of the Plate River, who were probably the first of the South American tribes to reduce it to cultivation, maize was the principal resource, though traces of a primitive root-culture survived. In Brazil maize was gradually invading the Atlantic coast, to which the manioc is indigenous, and where its

cultivation had been widely spread: and the substitution of the one for the other is to this day regarded as a mark of progress, and urged as an object of public policy." - p. 313.

"The two bases, then, of advancement in America were the domestication of the auchenias, limited to the Andes, and maize-agriculture, which was not only common to the three areas of aboriginal conquest, but was extensively pursued far outside their limits, both in the Southern and the Northern continents." - p. 322.

There is a good deal of discussion on the spread of maize culture, and a little on cookery, and some discussion of intoxicants, including chicha, a fermented infusion of maize.

289. Peet, S. D. Prehistoric farming. Wis. State Agr. Soc. Trans. (1887)25: 390-408. 2 W75T v. 25

The evidences of aboriginal agriculture in Wisconsin are considered. More remains of Indian corn-hills are found here than in any other state. The writer discusses the prevalence of corn-culture throughout the United States and Mexico, and points out the universal dependence of the Indians upon it as their staple cereal food. He also speaks of the sacred character of maize to the Indian and of the myths surrounding it.

290. Phillips, Caroline Louise, and Boerner, Emil George. Compilation relating to uses and products made of corn. 21pp., processed. Washington, D. C., U. S. Dept. of agriculture, Bureau of agricultural economics, Grain investigations, Mar. 1925. 1.9 Ec72Co

Abstracts and extracts from various publications have been brought together in this compilation which has been brought up to date with four supplements dated respectively 1926, 1929, 1931, and 1935.

The material included relates especially to industrial utilization of corn, including the kernel, cobs, and stalks for the manufacture of corn starch, oils, sirups, sugar, paper, solvents, fuel gas, artificial silk, cellulose, etc. Extracts are also included which show quantity and value of production, world trade, consumption, etc., of corn and its products.

A bibliography, or selected list of references, on the uses and the products made from corn, is appended to the compilation and to each of the supplements.

291. Plumb, Charles Sumner. Indian corn culture. 243pp. Chicago, Breeder's gazette print, 1895. 59 P73I

Bibliography, pp. 234-237.

The volume is a compilation of information for corn growers, but it has a chapter, Historical, pp. 7-11, in which the writer sets forth some evidence of pre-Columbian maize culture in the Americas. He writes of the corn cobs and corn kernels found in the burial mounds and tombs in Peru, Chile, Central and North America, and Mexico, and refers to the journals of LaSalle, Columbus, Cartier, John Smith and others to show the universality of corn culture in the New World.

292. Poindexter, Miles. Peruvian Pharaohs. 348pp. Boston, The Christopher publishing house [1938]. Libr. Cong. F3429.P755

"The most important and most widely distributed food product in both North and South America at the time these great continents became known to Europeans was 'Indian corn,' - known in pre-Columbian America by the Asiatic name ma-hiz, or ma-is. In Haiti, where the Spanish discoverers first came in contact with it, the name, as it was spoken by the natives, was written by the Spanish transcribers ma-hiz. The native name was obviously the same as the Chinese ma-i, wheat, barley, or other grain. (As to the Chinese word, Dr. Arthur W. Hummel, Library of Congress.)

"However, it is one of the many Proto-Aryan words which were brought to China with the rudiments of its civilization from the west. The same word, with related meanings appears with slight variations in the Indo-Aryan languages; Lettish, mayse (bread); Irish, maise (food); Old High German, maz (meat); Greek, maza (barley-cake); English, mast (acorns, beech-nuts).

"It is obvious that this staple crop of the ancient American farmers has spread over a vast area by artificial means, from some one original source, since it is not known in a wild state. Whatever its original source, it has been bred and hybridized by the skill of the American pre-Columbian farmers into many varieties, adapted to a vast range of climate, from the tropical river valleys of the Amazon to Canada and the Argentine, and from sea-level to 12,000 feet altitude in the Andes.

"The gift which the Indian farmers of America have made to the food supply of the world in 'corn'...has been worth more to mankind than all the gold and diamonds of South Africa.

"It is entirely possible that Indian corn itself, as well as its name was brought from Asia. From immemorial times it has been cultivated in the remote river gorges of western China and eastern Tibet, where it still forms the staple food of the isolated indigenous people...

"In view of the ancient commerce carried on by sea between China and Arabia it is significant that maize is said to have also reached Arabia, and to have been brought by Arabs into Spain in the 13th century. Henry Hudson, in his report of maize in New York, calls it 'Turkish wheat.'

"Edward Tregear calls attention to the use of the same word in Polynesia... The Asiatic mountaineers...like the Quichuas of Peru, have as their principal intoxicating drink a beer made from maize...

"Maize is also the principal crop of Yotkan, site of ancient Khotan, in Chinese Turkistan. This is one of the most isolated regions in the world... It is perhaps the oldest agricultural community in the world.

"Maize is said to have been brought by the Maori 'from overseas' in ancient times. In Indonesia it seems to have been used for food since the first primitive beginnings of human culture... A few grains may have escaped the demand for immediate food on the long voyage to America. From this handful of seed-corn its progeny may have spread through the vast range of latitude and altitude where it was cultivated in the New World for ages before Columbus." - pp. 169-170.

293. Polo de Ondegardo, Juan. Report...of the lineage of the Yncas and how they extended their conquests. Translated...and edited, with notes and an introduction, by Clements R. Markham. London, Printed for the Hakluyt society, 1873. (Works issued by the Hakluyt Society [no. XLIII], pp. 149-171) Libr. Cong. G161.H2

Describes briefly ownership of property in common with the proviso that only those who assisted in sowing the crop could share in the harvest, "and even when there were so many descendants as that there was scarcely a mazorca of maize for each, the rule was still observed; and it is still kept up in the district of Cuzco, where the lands are held in this manner." - p. 163.

294. Poore, Benjamin Perley. History of the agriculture of the United States. U. S. Commr. Agr. Rpt. 1866: 498-527. 1867. 1 Ag84 1866

In an account of the agriculture of the Indians, pp. 498-500, information is given on the method of cultivating corn and its use as food.

"The fare of the Puritan farmers was as frugal as it was wholesome... The bread was generally made of corn, barley, or rye meal, and if the diet was rather farinaceous than animal, there was less demand for medicine, and a larger, longer-lived growth of men and women than in these degenerate days of luxury and 'progress.'"

295. Popenoe, Wilson. The useful plants of Copan. Amer. Anthropol. (n.s.) 21(2): 125-138. Apr.-June 1919. Libr. Cong. GN1.A5

In the section on Cereals and Vegetables, the writer devotes one paragraph to maize, pp. 138-129, in which he states:

"Maize was undoubtedly the great staple food of the Ancient Maya, as it is today among their descendants. It is prepared for eating in very few ways, nearly the entire crop being consumed in the form of tortillas, thin round cakes made by treating the maize with lye, grinding its coarsely on the piedra de moler or grinding stone, adding enough water to make a paste, and cooking the thin cakes for a few minutes on a clay griddle."

296. Powell, E. P. The Indians as gardeners. Country Life in Amer. 29(6): 130, 132. Apr. 1916. 80 C832

"We have never given anything like due credit to our predecessors as farmers. They were very successful as gardeners and orchardists, and they solved some of the most difficult problems before we got here. Unfortunately they never explained them to us, and we have blindly attributed to nature some grand bits of evolution that we have inherited, but that must have taken these dusky people thousands of years to work out." - p. 130. Corn is one of these products and the writer says that it is really "king of the Western continent, if not of the whole world."

297. Prescott, William H. History of the conquest of Peru. Ed. by John Foster Kirk. 2v. Philadelphia, J. B. Lippincott co. [1902] Libr. Cong. F3442.P927

"The Peruvians turned this fixed variety of climate...to the best account, by cultivating the productions appropriate to each; and they particularly directed their attention to those which afforded the most nutriment to man... As the banana faded from the landscape, a good substitute was found in the maize, the great agricultural staple of both the northern and southern divisions of the American continent, and which, after its exportation to the Old World, spread so rapidly there as to suggest the idea of its being indigenous to it. The Peruvians were well acquainted with the different modes of preparing this useful vegetable, though it seems they did not use it for bread, except at festivals; and they extracted a sort of honey from the stalk, and made an intoxicating liquor from the fermented grain, to which, like the Aztecs, they were immoderately addicted." - v. 1, pp. 141-142.

The Spaniards are said to have seen "broad patches of cultivated land...disclosing hill-sides covered with the yellow maize and the potato." - v. 1, p. 250.

"Fields of Indian corn were to be seen in all its different stages, from the green and tender ear to the yellow ripeness of harvest time... Everywhere the natural capacities of the soil were stimulated by a minute system of irrigation." - v. 1, p. 433.

298. Priestley, Herbert Ingram. The Mexican nation, a history. 507pp. New York, The Macmillan co., 1923. Libr. Cong. F1226.P92

"From the earliest known times the most important crop in Mexico has been maize or Indian corn. It is considered an indigenous plant, developed in prehistoric times from a grass which was native to the lacustrine region of the center, and spread with the development of primitive irrigation. Its development as a food product is one of the distinguished triumphs of primitive American agriculture. Corn has always been the chief food of the natives, and, like the manioc of the West Indian area, it contributed potently to the permanency of the Spanish conquest. The first adventurers, who came before large-scale importation of European foods began, would have starved long before wheat became acclimated had they not been able to subsist on the new-found American grain. Corn grows in every part of the country. It is usually planted thickly in rows, and matures quickly. When crops failed, famine was almost sure to ensue, though during recent years importation of corn and wheat from the United States has usually prevented destitution from crop failures. No definite figures are available for corn production during the colonial epoch." - pp. 9-10.

299. Radin, Paul. The story of the American Indian. 371pp. New York, Boni & Liveright, 1927. Libr. Cong. E58.R13

It is said that, "apart from the sacred fire...and apart from the ever-present maize, no single unified civilization existed [among the American Indians] any more than did a single language or race. Yet

two subtypes of culture do seem to emerge... These more or less typical subcultures are very well represented by two specific tribes, on the one hand by the Creek and their kindred, and, on the other, by the Natchez and the tribes immediately adjacent.

"The economic basis of the life of both was maize. Like fire the worship of maize permeated every element of their life. Their main ceremony was grouped around it. Essentially this consisted of eating in common and in a religious manner, new maize which had been sown for this specific purpose. It was a solemn feast. When the maize was to be planted, a new plot of earth was chosen that had not been cultivated within the memory of man... Everything connected with the working of the field and with the culture of the maize had, among the Natchez, to be done by warriors... For anyone but a warrior to have touched the maize would have been regarded as profanation... As soon as the stalks approached maturity, the warriors went to the place where the maize was to be eaten and where a kind of granary had been erected."

A description of this feast is given, taken from the account of Du Pratz. - pp. 205-212.

"The most interesting feature of Creek life was the annual harvest-ceremony called the 'busk,' meaning 'act of fasting,' from the fact that no maize could be partaken until it was over. As in the case of the Natchez, the maturing of the maize was the basic element in this ceremony." - p. 215. The rites are described. "Here we see maize and fire still reigning supreme, almost as supreme as they had done among the Mayas and the Aztecs."

300. Reagan, Albert B. Plants used by the White Mountain Apache Indians of Arizona. Wis. Archeol. (n.s.) 8(4): 143-161. July 1929. Libr. Cong. E78.W8W8

About one page of the article relates to maize.

The writer tells how the Apache women grind corn for meal and how they make corn pone, pancakes, and bread from it. "...A flour dough bread are also wrapped in green corn husks and baked in the ashes, as is also grass seed occasionally. Corn smut is also eaten; On August 22, 1901, the writer saw one Apache, v-29, make a meal on honey and boiled smut. Also green corn when not yet in the 'milk' is boiled and eaten cob and all... Green corn is also roasted before the fire or in the husks under the ashes, or boiled." - pp. 144-145.

301. Redfield, Robert, and Villa R., Alfonso. Chan Kom, a Maya village. 387pp. Washington, D. C., Carnegie institution of Washington, 1934. (Carnegie institution of Washington. Publication no. 448) 446 R242

Bibliographies, pp. 375, 380.

In this cultural study of a Maya village, the writer devotes a section to Agriculture, pp. 42-47, wherein he explains the milpa system which is employed chiefly for maize growing. The chapter on Economics, pp. 51-67, includes a discussion of maize as the basis of the Maya economy. The following is quoted from p. 51:

"The ways of life, both practical and religious, rest upon the growing of maize. Maize is the people's food, their work, and their prayer - it fills the days and the talk. But the value of the harvest is fixed not merely by the immediate food needs of the village. Twice as much maize must be grown as the population will consume; half is converted, in the towns, into other goods. People take the road to the market, as well as the road to the milpa. As maize is regularly sold that other goods may be bought, maize becomes a measure of other values; goods and labor are sold in terms of maize; it is like money. But the value of maize is fixed outside of Chan Kom, in remote markets of the towns and city. To changes in this market price everyone in Chan Kom is attentive. 'What is maize worth?' is one of the first questions asked of a man returning from Valladolid. If the price goes up, so do the spirits of the people. If it goes down the travelling merchants sell little in Chan Kom, local economic enterprise languishes, the scheduled fiesta is canceled or a more modest program of entertainment is substituted.

"Moreover, the price of maize influences the extent of agricultural activity. All men grow maize; to abandon one's milpa is to forsake the very roots of life; tradition and religion conspire with economic necessity to make agriculture inevitable. But just how much maize is grown depends not merely on the local needs, but on the worth of corn in the city market. When the price of maize is low, people do not sell their surplus corn, and as it is not customary to accumulate maize reserves additional to what is needed for the current year, the agriculturalist reduces the size of his field, or even does not sow at all, but lives on what is left in his granary from the previous year."

302. Redfield, Robert. Tepoztlan, a Mexican village; a study of folk life. 247pp. Chicago, Ill., The University of Chicago press [1930] (The University of Chicago Publications in Anthropology. Ethnological series) 446 R242T

Bibliography, pp. 235-239.

That corn held an important place in the life of the village is attested by the place of the pot and griddle for cooking and baking corn near the hearth in every household. Consult the index under "maize" for references to its cultivation, harvesting, planting, etc.

303. Riant, Paul Édouard Didier, comte. La charte du maïs. 20pp. Paris, V. Palmé, 1877. 59 R35

Contains a copy of a document entitled Carta Donationis Verae Crucis et Primi Seminis Meligae, the appearance of which in 1810 provided an Asiatic origin for maize which up till then had been considered a native American plant. The author's thesis is that this so-called maize chart was not a genuine document and that it was of recent fabrication.

304. Ridgley, Douglas Clay, and Ekblaw, Sidney E. Influence of geography on our economic life. 658pp. New York [etc.] The Gregg publishing co. [1938.] 278 R43

A short section on corn, pp. 449-454, describes the kinds of corn, growing conditions, regions of production, cultivation, and harvesting. The following is quoted from p. 449: "As a food crop, corn acreage now ranks second, being exceeded only by the acreage devoted to wheat. In the United States, corn has the highest value of any crop produced, and is one of America's greatest gifts to modern civilization.

"The important place of corn in agriculture is due to its great value as food for man and as feed for animals. Young corn may be eaten on the cob or canned in factories for later use. Ripened grains may be made into hominy or ground into corn meal for corn bread and other foods. Corn flakes are a common breakfast food. Corn grains yield an oil used in salads and in paints. The grains also yield corn sirup and cornstarch.

"Corn provides feed for horses, cattle, swine, sheep, poultry, and other animals. The feed may be in the form of silage, fodder, ears of corn, shelled corn, or ground and mixed with other grains."

305. Rivet. Étude sur les Indiens de la région de Riobamba. Soc. des Américanistes. Jour. (n.s.) 1(1): 58-80. 1903. Libr. Cong. E51.S68

The Indians of the region of Riobamba are said to be almost entirely vegetarians. Maize is the essential basis of their diet. Its preparation as a food and drink is described. The Indian is capable of hard work when he has this drink, but cannot do anything without it. When he is working he chews a few grains of maize whenever he has an opportunity, and his endurance is remarkable. He can walk for twelve hours on end, then eat a few handfuls of maize, drink a few glasses of chicha, sleep on the ground, and be ready to start out again next morning. - pp. 62-63.

306. Robbins, Wilfred William, Harrington, John Peabody, and Freire-Marreco, Barbara. Ethnobotany of the Tewa Indians. Smithsn. Inst. Bur. Amer. Ethnol. Bul. 55, 124pp. Washington, D. C., 1916. 500 Sm63B no. 55

In a section on Plants Cultivated by the Tewa before the Spanish Conquest, the writer devotes pp. 78-99 to corn, which he treats under the following subheads: Varieties of corn, treatment of corn, property in corn, grinding corn, ritual use of corn-meal, cooking of corn products, gifts of food, various uses, trade in corn, tallies, medicinal uses of corn, pantomime of corn-growing and corn clans.

307. Roberts, Frank H. H., jr. The village of the Great Kivas on the Zuñi reservation, New Mexico. Smithsn. Inst. Bur. Amer. Ethnol. Bul. 111, 197pp. Washington, D. C., 1932. 500 Sm63B no. 111

In his introduction, the writer makes the following statements on p. 4:

"The nomadic occupants of the region, those who are considered the

progenitors of the later peoples, after a time obtained corn, together with the knowledge of how to plant and cultivate it. How this product reached them or whence it came is not known. The present hypothesis is that it was introduced from the Mexican area to the south. It was of the greatest importance to them, however, and provided the foundation upon which the entire structure of ensuing cultural development rested. The introduction of agriculture, the adoption of the corn-growing industry, because of its inherent nature, imposed upon the people a more sedentary existence. At first it probably did not have a marked effect on their mode of life, but as time went on and better methods of cultivation brought larger harvests it became necessary to provide storage places for the grain."

308. Roberts, Orlando W. Narratives of voyages and excursions on the east coast and in the interior of Central America; describing a journey up the river San Juan, and passage across the lake of Nicaragua to the city of Leon: pointing out the advantages of a direct commercial intercourse with the natives. With notes and observations by Edward Irving. 302pp. Edinburgh, Printed for Constable & co. [etc., etc.] ,1827.
Libr. Cong. F1431.R64

Contains an account of a visit to the principal settlement of the Valiente Indians about twenty-five miles from Chiriqui Lagoon which is part of the Mosquito Shore.

"Their plantain walks are very extensive; and, at Chrico Mola, extend several miles along the banks of the river... Large quantities of cassava and Indian corn are cultivated farther back; but, for subsistence, they principally depend upon the plantain, banana, and cassava. Their method of preparing ground for a maize crop is very simple; the person invites his neighbours to a chichee drink, states his wish to clear a certain piece of land, and requests their assistance. On the day appointed every man comes with his axe or moscheat, the trees and bushes are soon levelled, and the grain is loosely scattered on the ground amongst the fallen trees. This generally takes place a few days before the commencement of the rainy season. The fallen branches screen the young shoots from the heat of the sun, and in about five months the grain having overtopped this covering, is ready for gathering; rather a troublesome business, the grain being only reached by climbing over the trunks, branches, and remains of the fallen trees. When the grain has been collected, the wood, which is by this time well dried, is set on fire; and, assisted by the dry stalks of the maize, burns so fiercely as to leave merely ashes, and the stumps of the trees on the surface. By this simple plan the ground is considered sufficiently clear for every agricultural purpose." - pp. 74-75.

309. Robinson, Edward Van Dyke. Commercial geography. 455pp. Chicago, New York, Rand McNally & co. [1910.] 278 R56

Two short paragraphs on pp. 104-105 of the chapter on The Making of the United States tell how maize saved the early colonists from

starvation and "hastened by generations, and perhaps by centuries, the occupation of America by the white race."

"By far the most important crop, measured both by acreage and value, is corn." - p. 200.

310. Rosa, Luis de la. Memoria sobre el cultivo del maiz en Mexico. 43pp. Mexico, Imprenta de la Sociedad literaria, 1846.
59.22 R71

"Catalogo de obras sobre el maiz y su cultivo." - p. 10.

Notes the antiquity of the cultivation of maize in Mexico and emphasizes its importance in the development of tho country.

311. Ruiz Erdozain, Ernesto. Estudio sobre el cultivo del maíz. 316pp. México, Impr. y fototipia de la Secretaría de fomento, 1914. 59 R85

On cover: Secretaría de fomento, colonización e industria. Dirección de agricultura.

In his introduction the author emphasizes the importance of maize to the people of Mexico, whose well-being depends to a large extent on the abundance of the maize crop. The price of maize is said to influence the price of all commodities and to affect their consumption. Excessive cheapness of maize causes unemployment and a lowering of the standard of living of a large part of the population. Its importance as a food for man and beast, its ability to grow in different climatic regions and its immense importance to the Government and people of Mexico are stressed.

The American origin of maize and its laborious cultivation by the Indians are noted. It is said that hardly had the conquest of Mexico been accomplished when 18,856 square varas of land were assigned to each peon or infantryman for the cultivation of maize and twice that amount to each cavalryman. A scarcity of maize was frequent and was always followed by epidemics and deaths. Maize famines occurred in 1786, 1790, 1828, 1836, and 1841. The consumption of maize products is very great and their preparation keeps many women occupied.

Theories as to the extra-American origin of maize are noted and denied.

312. Russell, Frank. The Pima Indians. Smithsn. Inst. Bur. Amer. Ethnol. Ann. Rpt. (1904-05)26: 1-389. 500 S.63 v. 26

Two paragraphs on pp. 68, 72-73 describe the preparation of corn for food. Brief information on varieties grown by the Pimas and the time of planting and harvesting is given on p. 90. On p. 94 corn is mentioned as an article of trade in barter with the white men. On pp. 332-333 are the Indian words to the rain songs of the Pimas. These are followed by English translations, in which the words Corn and Corn Tassels and Corn Stalks appear.

313. Safford, William Edwin. Food plants and textiles of ancient America. Pan Amer. Sci. Cong., 2d. Proc. (1915/16) 1: 146-159. Washington, D. C., 1917. 330 P192

On p. 148, are four paragraphs on maize, in which the writer describes some of the specimens of maize taken from "prehistoric graves of Chile, Argentina, and Peru; from caves and cliff dwollings of northern Mexico and southwestern United States; and from graves and burial mounds of eastern United States... The exhibit also includes maize cakes or bread of the ancient Peruvians... Representations of maize in terra cotta and in stone are also shown, the most striking of which are those accompanying maize gods of the ancient Peruvians and Mexicans. In some specimens the ears of maize have evidently been cast from actual specimens; in others the maize is more or less conventionalized."

314. Safford, William Edwin. Foods discovered with America. Sci. Monthly 21(2): 181-186. Aug. 1925. 470 Sci22

A radio talk on science.

The following statements are found in the text: "Turning to Mexico, I shall have no time this evening to tell of the wonderful gardens of the Aztecs, described by Cortez in a letter to his king. It will be sufficient to say that maize, or corn, red peppers and beans were the chief food staples of the Mexicans." - p. 183. "The principal food staple in Brazil being the manioc, or cassava plant, and in Peru maize or Indian corn." - p. 184. "In North America the early colonists found the Indians of the Atlantic coast, from the Carolinas to Canada, cultivating, in addition to corn, beans, squashes, pumpkins and tobacco, the sunflower for the sake of its oil-yielding seeds and the closely allied Jerusalem artichoke for its fleshy tubers." - p. 184.

315. Salisbury, James Henry. History and chemical investigation of maize, or Indian corn. 206pp. Albany, Printed by C. Van Benthuysen, 1849. 59 Sa3

"Originally published in the Transactions of the New York State Agricultural Society, v. 8, 1848, pp. 678-873, with the title Maize, or Indian Corn."

This was a prize essay for which a premium of $300 was awarded. It consists of three parts: I. Synonyms and History; II. Chemical Investigation; III. Meteorology. Section I, pp. 678-792, deals with the origin of the maize plant, and its discovery in America by the European explorers and settlers. There are numerous quotations from Spanish and English journals and from such other travellers as Peter Kalm. The evidence all points to the widespread cultivation of and universal dependence upon maize by the aborigines of North and South America.

316. Sanford, Albert Hart. The story of agriculture in the United States. 394pp. Boston, New York [etc.] D. C. Heath & co. [1916] 30.9 Sa5

The Pilgrims were saved from starvation by the corn found in Indian mounds. - p. 2. John Smith bought corn from the Indians and saved the

settlers at Jamestown from starvation. "It was through the wisdom of John Smith, who learned from the Indians their method of raising corn and who compelled the settlers to cultivate it, that Jamestown became our first permanent settlement." - p. 3.

Because of the great demand and good prices for tobacco there was danger that the Virginia settlers would not raise enough corn for food. A rule was made by Governor Dale that no one should plant tobacco until he had planted two acres of grain. A later law provided that each settler must store enough grain for winter food. Since corn fields made good ambushes for the Indians the settlers were loath to plant corn, especially after the massacre of 1622. "A law was then made requiring each parish or group of farms to support a public granary, to which every person over eighteen years of age must contribute a bushel of grain yearly." - p. 16.

The importance of maize in the history of Jamestown and Plymouth is again brought out on pp. 25-26. "Fortunate, indeed, for the settlement of our country was this gift of maize which was made by nature and the American Indian."

317. Sapper, Karl Theodor. Geographie und geschichte der indianischen landwirtschaft. 98pp. Hamburg, Ibero-Amerikanisches institut, 1936. Libr. Cong. F2230.1.A3S3

Contains scattered references to maize, its origin and its use by the Indians of Central and South America.

318. Sargent, Frederick Le Roy. Corn plants, their uses and ways of living. 106pp. Boston, Houghton, Mifflin & co., 1899. 59 Sa7

Section XI, pp. 91-102, Maize, the Corn of the West, contains an account of the history and development of maize-growing in America, corn-cookery and utilization of the plant as fodder and industrially. The writer states that "the place of maize in the Western Hemisphere is similar to that of rice in the Far East." - p. 91. He also points out the Indians' dependence on maize and thinks that the English settlers would have found it much more difficult to establish their foothold on this continent without the aid of this "beautiful and beneficent American plant."

The many commercial uses for corn are mentioned, as is also its use in ornamental ways, such as on our coins and postage stamps. The writer alludes to corn as "the richest treasure of the West." - p. 102.

319. Schmidt, Louis Bernard. The westward movement of the corn growing industry in the United States. Iowa Jour. Hist. and Politics 21(1): 112-141. Jan. 1923. Libr. Cong. F616.I5

Reprinted in part in Readings in the Economic History of American Agriculture (pp. 381-389), edited by Louis Bernard Schmidt and Earle Dudley Ross. New York, The Macmillan co., 1925.

The author devotes the first five pages of this article to the cultivation, use and trade of corn by the early settlers and to extracts from Champlain's and John Smith's accounts of corn cultivation by the Indians and to John Smith's account of its preparation as a food by the Indians.

320. Schoolcraft, Henry R. Archives of aboriginal knowledge, containing all the original papers laid before Congress, respecting the history, antiquities, language, ethnology, pictography, rites, superstitions, and mythology of the Indian tribes of the United States...volume I, 575pp. Philadelphia, J. B. Lippincott & co., 1860. 135 Sch6

The following excerpts are taken from a sub-section under Antiquities, pp. 48-134, called The Influence of the Cultivation of Zea Maize on the Condition, History, and Migrations of the Indian Race:

"The influence of the cultivation of the Zea Maize on the semi-civilization and history of the Indian race of this continent, has been very striking. It is impossible to resist this conclusion, in searching into the causes of their dispersion over the continent. We are everywhere met with the fact, that those tribes who cultivated corn, and lived in mild and temperate latitudes, reached a state of society which was denied to mere hunters... The tribes of the Carolinas and Virginia, extending along the Atlantic quite into New England, raised large quantities of the corn, or zea maize, and they relied upon it as one of their fixed means of subsistence." - p. 60.

"The fact that the ancient Indian tribes of the Mississippi Valley brought the Zea maize with them, is almost demonstrative proof that they proceeded from southern or intertropical latitudes. This grain was the element of Mexican civilization. They could not have lived in large masses or towns without it; consequently, they could not, without such a fixed means of subsistence, have built the pyramids of Cholula and Chalco, and other like works. Erratic tribes who once knew the value of this grain, would never relinquish it or forget its mode of culture, however far they migrated. Most of our tribes have invented myths, to denote it as the gift of the Deity to them, and as designed for their subsistence when game failed. The cultivation of large fields of corn would have enabled these tribes to band together, and thus to have it in their power to erect the largest mounds in the West. It is remarkable, indeed, that the most numerous as well as the largest mounds are seated on fertile plains or in rich alluvial valleys, which are the best corn lands West of the Alleghanies." - p. 64.

321. Shaler, Nathaniel Southgate. Nature and man in America. 290pp. New York, C. Scribner's sons, 1891. Libr. Cong. GF501.S52

Although the New World has contributed only one animal - the wild turkey - to the domestic uses of civilized man, "the contribution of plants to domestication from the Americas has been most important. Indeed, we may say that the plants which the New World has afforded have been sufficient to make something like a revolution in the economic condition of our civilization. The potato and Indian corn have profoundly altered the agriculture of Europe." - p. 176.

322. Shannon, Fred Albert. Economic history of the people of the United States. 942pp. New York, The Macmillan co., 1934. 277.12 Sh1

Comments on authorities, pp. 887-911.

Ch. III, pp. 47-72, is devoted to the Beginnings of Agriculture. On p. 48 the statement is made that Indian corn takes precedence in importance over all the other plants found first in America. Indian agriculture and the Colonial debt to the Indians are discussed on pp. 50-53. The writer calls attention to the corn breeding work of the Indians and to the fact that the white man has not produced a "perceptibly" better grade of corn or a higher average yield per acre and "has not improved fundamentally upon Indian practices." The debt of the early colonists to the Indians for food, particularly corn, for cleared land, etc., is brought out on pp. 52-53.

323. Smith, Huron Hubert. [A series of four bulletins on the ethnobotany of the Wisconsin Indians]. Milwaukee (Wis.) Pub. Mus. Bul. v. 4, nos.1-3, v. 7, no. 1. Milwaukee, 1923, 1928, 1932, 1933. 500 M64B

Contents: v. 4, no. 1, Ethnobotany of the Menomini Indians (see pp. 66-67 for corn); v. 4, no. 2, Ethnobotany of the Meskwaki Indians (see pp. 257-259 for corn); v. 4, no. 3, Ethnobotany of the Ojibwe Indians (see pp. 402-403 for corn); v. 7, no. 1, Ethnobotany of the forest Potawatomi Indians (see p. 101 for corn).

Each of these bulletins contains brief material on the use of maize as food by the various tribes in Wisconsin, on the origin of the plant, methods of culture, and ways of storing and preserving the grain.

324. Smith, John. Travels and works of Captain John Smith, President of Virginia, and Admiral of New England, 1580-1631, edited by Edward Arber... a new edition, with a biographical and critical introduction, by A. G. Bradley. 2v. Edinburgh, J. Grant, 1910. 125 Sm5T

Volume 1, pp. 41-174, contains Captain Smith's well known Description of Virginia, first printed at Oxford by Joseph Barnes in 1612 under the title "A map of Virginia. With a description of the countrey, the commodities, people, government and religion. Written by Captain Smith, sometimes governour of the countrey. Whereunto is annexed the proceedings of those colonies, since their first departure from England..." In the section, Of the Planted Fruits and How They Use Them, pp. 61-63, Captain Smith describes the Indian method of clearing land and of planting corn and of cooking it for food.

This edition of the Travels and Works of Captain John Smith also contains on pp. 275-781 of volumes 1 and 2 Captain Smith's Generall Historie of Virginia, New England and the Summer Isles, in six books, first printed in 1624. Book 2 is A Reprint with Variations, of the First Part of the Map of Virginia, 1612. It contains the same material on corn culture by the Indians, pp. 357-359, which appears on pp. 61-63.

325. Smith, Joseph Russell. Industrial and commercial geography. New ed., 959pp. New York, H. Holt and co. [1925] (Amer. Business ser.) 278 Sm5I Ed. 2

The Library of Congress has later editions of this book.

Ch. III is entitled The Cereals, and section 8, pp. 92-112, deals with corn. Its climatic requirements, chief regions of production, relation to other cultivated crops and to livestock, the improvement and extension in corn growing and the value of corn to the settlers of America are discussed. The colonists learned from the Indians how to cultivate maize, which could be grown among the trees of the forest and did not require smooth land free of stumps and stones as do the other small grains. The corn could be harvested at the convenience of the grower; it yielded twice as much as small grain; it could be easily kept; and could be served in many forms as food. "The husk that protected the grain served in the mattress for the Colonist's bed; the stalks and leaves fed the horses and cows through the winter, even after they had served for months as a thatch for the temporary shed that shielded the animals from storm." - p. 92.

"Corn, but little used as human food in the northern half of the United States, is in common use in the Southern states and is often the chief breadstuff of white and black alike. Its excellence for the support of human beings is unquestioned by physiologists and it was well shown by the endurance of regiments of soldiers in the Confederate armies during the American Civil War. Nevertheless, corn is generally unappreciated as food outside of the southern states, except in regions where the people are poor, as in Italy, Rumania, Hungary, and Mexico, where it is used because it is cheaper than the other breadstuffs. Two shortcomings suffice to explain its small use: it has no gluten and will not make a dough, or light bread; second, the bread loses much of its palatability, though not of its nutrition, upon getting cold." - pp. 102-103.

"Owing to the ability of corn to grow on very rough land where the other grains will not do so well, or yield so much, it has come in many parts of the world to be the mainstay of primitive or isolated hill peoples where the climate permits." - p. 94.

"Corn in tropical America and Mexico... In every one of them - Mexico, the five Central American countries, Colombia, Ecuador, Peru and Bolivia - the bulk of the population, native Indians or half-breed peoples, derive their nourishment to a surprising degree from corn and beans... In Mexico and other of these countries the commonest form of corn bread is the 'tortilla' or hot corn cake which can be baked over an open fire... Among the negro population of the West Indian Islands, corn is widely used for food." - p. 105.

In the United States, only a small proportion of the corn produced is used for human food, "but is grown as a supply crop, fed to animals on farms where raised, and sold in the more condensed forms of beef, pork, mutton, horses, and mules. The biggest corn growing states are also the ones which market the major share of the fat hogs and cattle." - p. 99.

Somewhat similar statements to those quoted here may be found in Mr. Smith's Commerce and Industry, published in 1925.

326. Smith, Joseph Russell. The world's food resources. 634pp. New York, H. Holt and co., 1919. 389 Sm6

Ch. V, pp. 107-137, deals with corn and its substitutes under the following subtopics: the value of corn to the settler and people of America, usefulness of corn in rough countries like Appalachia, corn as food, climatic requirements of corn, the American corn-belt, relation of corn to other products of corn-belt, the improvement and extension of corn growing, corn in the cotton belt, American corn exports, corn in tropical America and Mexico, corn in the Paraná Valley of South America, corn in other countries, the future of corn supply, substitutes.

"From the American point of view, corn has been well called the king of crops. It is the greatest crop on American farms to-day. It saved the civilization of New England in the winter of 1621, and again in a different way in 1918. It is said that the corn procured from the Indians by the Pilgrim fathers in the dreadful winter of their first landing, 1620-21, saved them from famine, and American agriculture, based on corn, enabled the Western World to withstand the German onslaught in the third and fourth years of the Great War." - p. 107.

Corn is "the mainstay of primitive or isolated hill-peoples in many parts of the world." Corn, both as a food and a staple of commerce is of greatest importance in the Southern Appalachian region. Despite its early importance to the early settlers and its widespread use in many parts of the world, its value as a food stuff has declined in the northern United States and northwestern Europe. - p. 110.

"Corn is the crop second in importance in the cotton lands of the South." - p. 119.

327. Snow, B. W. Indian corn industry in the United States. In U. S. Dept. Agr. Report on the use of maize (Indian corn) in Europe and on the possibilities of its extension. [Dept. Rpt. 49], pp. 23-36. Washington, D. C., 1891. 1 Ag84Sp no. 49

Also published in French, German, Spanish, and Danish.

"The growing of maize is not only the most important branch of our arable agriculture, but the product itself is again the foundation upon which rests a large part of our wonderful rural development... On the farm it feeds the working animals, fattens the beeves and hogs, is an important constituent in butter and cheese production, and forms part of the family ration. It appears upon the table in American homes both as meat and bread, and again in the form of tempting and appetizing delicacies skillfully prepared from some of its many products." - p. 24.

"...in the United States it is the principal breadstuff of the colored workers of the South, where long hours of arduous labor in the cotton fields under conditions severely testing the endurance of workers are required.

"The value of corn meal as a constituent of the army ration was demonstrated practically during the war of the rebellion. The larger portion of the bread used by the Southern armies was made from corn, while at the same time it furnished a large part of the food supply of the Federal forces." - p. 27.

"During recent years a very important industry has grown up in this country which has resulted in making a very desirable addition to our American daily food supply. The canning of green sweet corn has become in many sections a very large interest, and the product enters into the channels of trade in all sections of the country, is found in every grocery store, and reaches the family table of a large portion of our American homes." - p. 28.

328. Some information respecting the use of Indian corn: collected from the papers of Mr. Winthrop & Mr. Howard; with observations from Mr. Parmentier, on the use of potatoes in bread; and Mr. Dossie's directions for the making of bread in private families. 24pp. Birmingham, printed and sold by Thomas Pearson; sold also by R. Baldwin, and L. B. Seeley, Pater-Noster Row, London, 1795. R389.2 So5

This dissertation which extolls the virtues of the other cereals than wheat (of which there was a shortage at the time of writing) for bread making, is a compilation from various sources. Indian corn, or maize, is proposed as a wheat substitute, and its uses in Indian cookery are described. "This corn the Indians dress several ways for their food. Sometimes boiling it whole till it swells and becomes tender, and so they either eat it alone, or with their fish or venison, instead of bread. Sometimes they bruise it in mortars, and then boil it; but they commonly use it in this way, viz. they parch it in ashes or embers, stirring it carefully so as to prevent it from burning... they then sift it thoroughly from the ashes, and beat it in their mortars into fine meal. This is their constant food at home; and when they travel, they put it up in a bag, so as to have it at all times ready for eating either dry or mixed with water. It is what their soldiers carry with them in time of war, and is a very wholesome kind of diet. The settlers sometimes boil it up with milk or water, adding to it afterwards a little sugar." - p. 5.

"But the best sort of food which the English settlers make of this corn, is what they call SAMP... This was the most usual diet of the first planters in New England and other parts of North America, and is still in use amongst them, as well in sickness as in health; and was often prescribed by the learned Dr. Wilson to his patients in London. The Indians who live chiefly upon this corn, are remarkably healthy; and the stone, in particular, is a disease that is rarely known amongst them.

"The English settlers have found out a method of making very good beer from the Indian corn after it is baked into bread. They break or cut the bread into large lumps about as big as one's fist, and then mash it, and proceed in other respects as with malt; and afterwards manage the impregnated liquor the same as wort, either adding or omitting hops, as they please. This beer is wholesome and pleasant, of a good brown colour, and keeps well." - pp. 7-8.

The recipes for suggested corn cookery follow.

329. Southey, Robert. History of Brazil. 3v. London, Longman, Hurst, Rees, Orme, and Brown, 1817-22. Libr. Cong. F2524.S72

Maize is mentioned in Volumes I and III.

The origin of the name is briefly discussed, and its use as a food and drink by some Indian tribes is noted.

330. Spinden, Herbert Joseph. The invention and spread of agriculture in America. Amer. Mus. Nat. Hist. Jour. 17(3): 181-189. Mar. 1917. 500 N483J

"The substance of this article was presented at the Second Pan-American Congress, Washington, D. C., December, 1916."

"On the foreland of ancient American history the invention of agriculture is the one outstanding fact. For without a sure and abundant food supply to be secured only by domesticating plants, the American Indians could never have risen above the status of hunters, herders, or lowly fishermen. Agriculture was indeed the indispensable invention that made possible all the higher arts, both in the Old World and in the New... In each area, the increase in population and the accumulation of wealth that resulted from this conquest of the vegetable kingdom made possible intellectual and artistic expression upon a grand scale." - p. 181.

Maize, beans and squashes were the common agricultural products wherever agriculture was practiced in America, and of these, maize was the staple.

331. Spinden, Herbert Joseph. The origin and distribution of agriculture in America. Internatl. Cong. Americanists. Proc. (1917)19: 269-276. Washington, D. C., 1917. Libr. Cong. E51.I696

"Agriculture may be named as the antecedent condition for all the high cultures of the New World. The concept of agriculture may have had several points of origin, but this does not seem likely, since maize, beans, and squashes were common products wherever agriculture was practised in America...

"Maize (Zea mays) seems to have been developed from a wild grass which may be the téosintli (Euchlaena mexicana) of the Mexican highlands. When we consider the geographical and climatic range of the adaptation of maize we must admit that the Mexican plateau is an intermediate and very likely home for the wild progenitor of this great food plant. On the north its cultivation had been extended in pre-Columbian times to the mouth of the St. Lawrence and on the south to the mouth of the Rio de la Plata. The plant had been accultured to extreme conditions of heat and cold, drought and moisture...

"Dr. Laufer actually explained away the claims for a pre-Columbian use of maize in China before they had been made by Mr. Collins of the Bureau of Plant Industry. The earliest references to this food plant are cinsiderably subsequent to the discovery and conquest of America, and, while the evidence points to Tibet as the region from which maize entered China, we must remember that the caravan trade between the Near and Far East was at its height in 1500...

"Agriculture seems to have received special emphasis in Mexico and Peru. Maize, beans...squashes are common to both areas, but with considerable local variation... The principal crops of the Maya were probably much the same as on the highlands of Mexico, with maize as the great staple. Varieties favorable to a humid environment had doubtless been developed from the highland stock by selective breeding as agriculture worked its way down into the lowlands...

"In the great Amazon Valley and in the flanking valleys of the Orinoco and the Plata, we find agriculture unaccompanied by high social developments, although weaving and pottery-making are everywhere practised. Maize, beans, and squashes are known throughout this area, but maize is displaced from the position of first importance by manioc...

"The lines of agricultural migration over the greater part of South America may be indicated in the grouping of the various language stocks. The Arawakan tribes, which seem to have been originally distributed along the entire northern coast of South America as well as far to the south across the Amazon Valley, were perhaps the most important distributors of agriculture in the lowlands. Through pressure exerted by the wilder Carib tribes, many Arawak groups were driven out over the West Indies. In their flight they carried with them manioc, maize, sweet potatoes, and other domesticated plants...

"The third type of agriculture was adapted to temperate conditions. It is most completely exemplified in the eastern half of the United States, but seems also to have been developed, though to a much less extent, in parts of the Argentine and Uruguayan pampas. Maize is again the staple, with beans and squashes as associated crops...

"If we remember that in the four hundred years that the white man has dominated the New World he has not reduced to cultivation from wild stock a single important staple, the wonder of the American Indian agriculture becomes still greater."

332. Spinden, Herbert Joseph. Thank the American Indian; we owe the Indian well over half of our great agricultural wealth; potatoes, maize, cacao, beans, the peanut, rubber and other plants were domesticated here long before Columbus discovered America. Sci. Amer. 138(4): 330-332. Apr. 1928. 470 Sci25

"The present economic position of the United States, the strongest of any country on earth, is due in a large measure to the plants, materials, and processes which constitute our inheritance from the ancient civilizations of American Indians. Well over half of our total agricultural wealth, in fact about four sevenths of it, consists of crops unknown in the Old World until after the momentous voyage of Columbus. The value of this Indian inheritance annually reaches sums beyond the dreams of avarice...

"Under all this culture, and making it possible, were plants furnishing food, fiber and other substances which had been tamed to the garden... The nuclear civilization of the New World came into being on the highlands of Mexico and Central America as a result of the domestication of maize, beans and squashes. Agriculture made possible the culture which we now call 'Archaic.'" - pp. 330-331.

333. Squier, E[phraim] G[eorge]. Nicaragua; its people, scenery, monuments, resources, condition, and proposed canal. Rev. ed., 691pp. New York, Harper & brothers, 1860. Libr. Cong. F1523.S78

"Maize flourishes luxuriantly, and three crops may be raised on the same ground annually. It is essentially the 'staff of life' in all Central America, being the material of which the eternal tortilla is composed. The green stalks, sacate, constitute about the only fodder for horses and cattle in the country, and is supplied daily in all the principal towns. The abundance of this grain may be inferred from the fact that a fanega of Leon (equivalent to about five bushels English) of shelled corn, in 1849, commanded in the Capital but one dollar." - p. 652.

"In their food, the Nicaraguans are...exceedingly simple. Tortillas and frijoles are the standard dishes. The first are composed of maize... Fresh and unblemished maize on the ear is always selected. It is shelled, soaked in alkali to remove the hull, and then carefully and repeatedly washed in cold water. It is afterwards placed on a metlatl, or grinding stone, and reduced to the extremest fineness. A very little cheese is ground with it, to give it consistency. A roll is then taken in the hands, beaten into a flat cake, and placed on an earthen pan, already heated upon the fire... The tortilla is an aboriginal invention." An engraving is shown of an ancient grinding stone. The form is said to be unchanged to this day. - pp. 256-257.

334. Squier, Ephraim George. The states of Central America; their geography, topography, climate, population, resources, productions, commerce, political organization, aborigines, etc., etc., comprising chapters on Honduras, San Salvador, Nicaragua, Costa Rica, Guatemala, Belize, The Bay Islands, the Mosquito Shore, and the Honduras Inter-oceanic railway. With numerous original maps and illustrations. 782pp. London, Sampson Low, son & co.; New York, Harper & brothers, 1858. Libr. Cong. F1428.S77

"The geographical and topographical features of all countries have had, and always must have, an important and often a controlling influence upon the character and destiny of their populations. The nature and extent of this influence receives a striking illustration both in the past and the present condition of Central America. At the period of the discovery...upon the high plateaus of the interior of the country, and upon the Pacific declivity of the continent, where the rains are comparatively light, the country open, and the climate relatively cool and salubrious, were found great and populous communities, far advanced in civilization... Upon the Atlantic declivity... among dense forests, nourished by constant rains into rank vigor... were found savage tribes of men, without fixed abodes...

"On the high plains of Honduras and Guatemala...wide and fertile savannas invited to agriculture, and yielded to the rudest implements of cultivation an ample harvest. The maize, that great support of aboriginal civilization in America, was probably indigenous there, and was thence carried northward over Mexico and the Floridas by the

various families who established themselves in those regions, and whose languages and traditions point to the plateaus of Guatemala as their original seat." - pp. 21-23.

In Ch. XI on the products of Honduras we find that "maize flourishes luxuriantly, and two crops a year may be raised on the same ground wherever the soil is sufficiently moist, or may be made so by irrigation. In the interior, among the mountains, it is not customary to plant the fields a second time in the course of the year, except for the purpose of growing the stalks, to be cut down as sacate or fodder for cattle. The variety of maize in general use more resembles that of New England than of the Mississippi Valley... Here, as in nearly every part of tropical America, maize is essentially the 'staff of life', and, made into tortillas, tamales, atole, tiste, and other forms of food, constitutes the chief support of the people. It is generally cheap, but occasionally suffers from the chapulin or langosta, a species of locust or flying grasshopper, which comes in such clouds as completely to destroy the largest milpa in the course of a few hours. As the pest of langost is usually general, the visitation sometimes results in a great scarcity, bordering on famine; in which cases maize advances to as high as four and five, and even ten dollars per bushel. Fortunately, the insect seldom attacks the fields which are planted high up on the slopes of the mountains."

335. Standley, Paul Carpenter. Flora of Costa Rica. Field Mus. Nat. Hist. Pubs. 391, 392. (Bot. Ser. v. 18), 2v. Chicago, 1937. 500 C432B v. 18
Bibliography, v. 1, pp. 62-63.

"Maize and beans are the two important Costa Rican products for local consumption. Maize is cultivated from sea level to the uppermost limit of cultivation on the higher mountains, three crops a year being obtained sometimes in the tierra caliente, one only in the cold regions. All the corn grown is of the hard-kerneled or flint type... It has been grown in Costa Rica doubtless since the very beginning of agriculture, and reached Peru long before the Spanish conquest." - pp. 94-95.

336. Standley, Paul Carpenter. Flora of Yucatan. Field Mus. Nat. Hist. Pub. 279. (Bot. Ser. v. 3, no. 3), 492pp. Chicago, 1930. 500 C432B v. 3,no.3

In the short section on Zea Mays L., pp. 210-213, the writer states that the whole Maya civilization was based upon maize and that soil exhaustion due to growing this plant is believed to have caused the successive migrations of the Mayas. The milpa system of agriculture is briefly described, as are the foods made from maize. Some of the Maya vocabulary relating to maize is included.

337. Steece, Henry M. Corn culture among the Indians of the Southwest. Amer. Mus. Nat. Hist. Nat. Hist. 21(4): 414-424. July-Aug. 1921. 500 N483J
Reprinted in Indian School Jour. 22(3): 9-19. Oct. 1922. (Library of the U. S. Dept. of Agriculture has a copy of this in separate form. 59 St3.)

In this description of present-day methods and customs of corn culture in the region occupied by the Pueblo and Navajo Indians in northwestern New Mexico and northeastern Arizona, the author writes of the importance of corn in past as well as present times. On p. 415 he states: "Corn and meal furnished excellent mediums for trade between the inhabitants of the different pueblos and the nomadic Apaches, Navajos, Utes, Kiowas, and Comanches. Men carried large quantities of meal on their backs far to the east, travelling for days until a band of hunters was encountered, when exchange was made for deer and buffalo hides...

"At the present day as in the time of the conquistadores corn and its cultivation assume a big place in the life of the Indian of the Southwest. Beans and squashes were also raised, but the Indian's chief food products consisted of corn. Maize was easily cultivated, yielded well, and was very nutritious; when dry, it was not injured by heat or cold. It could be preserved in a cache or cave for long periods, was easily gathered, and for food use required but little preparation."

338. Steffen, Max. Die landwirtschaft bei den altamerikanischen kulturvölkern. 139pp. Leipzig, Duncker & Humblot, 1883. Libr. Cong. E65.S81

The author discusses land tenure and the agriculture of the Aztecs, the Mayas, the Chibchas, and the Incas. In all cases he finds that maize was a basic product, and he notes its manner of cultivation and its use.

339. Stevenson, Matilda Coxe. Ethnobotany of the Zuñi Indians. Smithsn. Inst. Bur. Amer. Ethnol. Ann. Rpt. (1908/09)30: 31-102. 500 Sm63 v. 30

The following is quoted from the section on edible plants, which also includes a description of the variety of dishes for which corn was used by the Zuñi:

"Though not indigenous to the United States, corn was the staple food of the inhabitants of the Southwest long before the coming of the Spaniards in the middle of the sixteenth century, having been brought into this section either by peoples migrating from the south or by aboriginal traders. It is found, charred, in almost every cliff-house of the Southwest." - p. 73.

The Zuñi have many ceremonial uses for plants, and corn is a conspicuous feature in many ceremonies: in the dance, by medicine men, as fringes on the sash of garments, as shuttle cocks (made from husks). - pp. 99-100.

340. Stickney, Gardner P. The use of maize by Wisconsin Indians. Parkman Club Pubs. no. 13, pp. 68-87. [Milwaukee, Wis.] Printed for the Parkman club by E. Keogh [1897] Libr. Cong. F576.P24

Not examined.

341. Stine, Oscar Clemen. United States agriculture, the history of. In The Book of rural life, v. 10, pp. 5727-5768. Chicago, Bellows-Durham co., [1925] 30.1 B64

In this article on the history of United States agriculture, there is a short account of Colonial agriculture and Indian agriculture, in which the writer points out that corn and tobacco, two of our principal crops, were given us by the Indians. "The first settlers at Jamestown were saved from starvation by the corn which they secured from the Indians... They adopted corn as their principal food crop and it soon became an article of commerce between the colonists and the Indians as well as among the several colonies." - p. 5727.

On pp. 5748-5749, there is a discussion of the westward advance of corn culture and the gradual giving way of wheat for corn growing in the Corn Belt region. Dot maps are included to show production and distribution of corn growing in the United States.

342. Stirling, Matthew W. America's first settlers, the Indians. Natl. Geogr. Mag. 72(5): 535-596. Nov. 1937. 470 N213

See pp. 592-594 for corn as an important contribution to mankind and uses of corn for food, fuel, moccasins, mats, masks, toys, floats for fish, etc.

343. Stites, Sara Henry. Economics of the Iroquois. 160pp. Lancaster, Pa., The New era printing co., 1905. (Bryn Mawr College monographs. Monograph series, v. I, no. 3) Libr. Cong. AS36.B9 v. 1, no. 3

Bibliography, pp. 157-159.

Thesis (Ph. D.) - Bryn Mawr College.

For the place of corn in the economic life of the Iroquois see particularly pp. 22-23, 57-59.

344. Stout, A. B. Vegetable foods of the American Indians. N. Y. Bot. Garden. Jour. 15(171): 50-60. Mar. 1914. 451 N48J

A part of this discussion, pp. 50-51, is devoted to maize. The appearance of the aboriginal cornfields and their methods of cultivation are described, and the statement is made that no distinctly new types of corn have been developed by the white man that the Indians did not already have. "Indian corn is, without doubt, the greatest contribution which the Indian has made to the civilization and progress of the world." - p. 51.

345. Strachey, William. The historie of travaile into Virginia Britannia; expressing the cosmographie and commodities of the country, together with the manners and customes of the people... London. 203pp. Printed for the Hakluyt society, 1849. (Works issued by the Hakluyt society. [no. VI]) Libr. Cong. G161.H2

The cultivation of maize by the Indians is described, pp. 116-117.

346. Sturtevant, Edward Lewis. The growing of corn. Mass. State Bd. Agr. Ann. Rpt. (1880)28: 77-130. Boston, Rand, Avery & co., 1881. 2 M38R v. 28

Most of this paper is devoted to considering practical measures for improvement in corn raising, including ploughing, fertilizing, planting, cultivating, harvesting, etc. The introductory pages are historical and tell how maize was cultivated by the American Indian tribes and how the white settlers learned their methods from the red men.

347. Sturtevant, Edward Lewis. Indian corn. N. Y. State Agr. Soc. Trans. (1879)33: 37-74. 1884. 2 N48T v. 33

Bibliography, p. 39.

This paper was presented at the society's annual meeting on Jan. 22, 1879. The discussion is divided into the following sections: I. American history; II. European history; III. Original varieties; IV. Variations; V. Indian cultivation; VI. Products; VII. Postscript.

The text is amply foot noted and there are many quotations and extracts from other authorities. The writer has used these to show the frequent recurrence of allusions to corn culture and cookery among the Indians in the journals of the explorers and voyageurs. He has also marshalled the authorities who believe in the Old World origin of the maize plant in one group and those who maintain its American origin in another group.

The author writes in his introduction, that the subject of his research is entirely worthy of investigation since it furnishes support to so many people, is so widely cultivated, and furnishes such an important increment to commerce.

348. Sturtevant, Edward Lewis. Indian corn and the Indian. Amer. Nat. 19(3): 225-234. Mar. 1885. 470 Am36

The article sets forth the thesis that maize has been generally cultivated in the Americas since ancient times.

"Maize is the product of an ancient American civilization, which if small as compared with that of to-day, yet was capable of achieving results which we of the present gladly appropriate. It constituted the daily food of tribes which have now disappeared from existence, and at the time of the discovery was a cherished plant throughout the temperate and the tropical regions of America, and finds mention in nearly every account of the voyageur, or hardy explorer who penetrated beyond the confines of the coast." - p. 225.

The writer points out on p. 226, that the antiquity and importance of maize "is attested by the circumstances of its connection with religion, and its acquirement of sacred characteristics."

Referring to corn improvement, the writer states:

"At the time of the discovery of the various regions of our Country in detail, the Indians had already accomplished in the matter of improvement of varieties of maize what we are at present using, and we have no evidence, I speak after careful research, that any new forms of maize have appeared from our two centuries or more of civilized cultivation." - p. 233.

349. Sturtevant, Edward Lewis. Sturtevant's notes on edible plants, ed. by U. P. Hedrick. 686pp. Albany, J. B. Lyon co., state printers, 1919. (N. Y. (State) Dept. Agr. 27th Ann. Rpt. 1918/19, v. 2, pt. 2. Rpt. N. Y. Agr. Expt. Sta. 1919 [pt. 2]) Folio 452.8 St9

Under the heading of Zea mays, is found a discussion on the antiquity and history of corn growing in Central, North and South America, with quoted extracts from many sources. The following paragraph appears on p. 615:

"We thus see that the culture of corn was general in the New World at the time of the discovery; that it reigned from Brazil to Canada, from Chile to California; that it was grown extensively in fields; and that it had produced many varieties - always an indication of antiquity of culture. It furnished food in its grain, and, from its stalks, sugar to the Peruvians, honey to the Mexicans and a kind of wine or beer to all the natives of the tropics."

350. Tellez, G. El maíz. La Hacienda 17(1-3): 3-11, 50-54, 76-79. Jan.-Mar. 1922. 6 H11

Contains a history of corn, its origin, cultivation, and industrial uses.

351. Ternaux-Compans, [Henri], ed. Recueil de documents et mémoires originaux sur l'histoire des possessions espagnoles dans l'Amérique, à diverses époques de la conquête, renfermant des détails curieux sur les moeurs, les coutumes et les usages des Indiens, leurs relations avec les Espagnols, et sur la géographie et l'histoire naturelle de ces contrées. 297pp. Paris, Gide, 1840. Libr. Cong. E123.T32

Partial contents: Moeurs et coutumes des habitans de la Province de Cueba, by Gonzalo Hernandez de Oviedo y Valdez. - pp. 114-131. (Cueba is said to comprise the provinces ordinarily known as the isthmus of Panama. The Indians of Cueba are said to eat maize and to make from it a fermented drink which they call chicha. The method of making this drink is described. On the seventh day it becomes vinegar but they do not allow that to happen. This drink is said to be very healthy, nourishing, and fattening. Their method of making vinegar from maize is also described. - pp. 131-132.); Relation...de la conquête du nouveau royaume de Grenade, by Gonzalo Ximenez. - pp. 146-170. (Maize is said to be harvested in certain districts during eight months of the year. - p. 167.)

352. Thomas, Cyrus. The Indians of North America in historic times...in conference with M. J. McGee. 464pp. Philadelphia, George Barrie & sons, 1903. (History of North America, edited by Guy Carleton Lee, v. 2) Libr. Cong. E77.T45

The place that the discovery and cultivation of maize played in the civilization of southern Mexico and Central America and the European colonies is well stated in a paragraph on p. 430. "Its bearing on American history must therefore be taken into consideration whenever history is fully treated."

353. Thomas, Cyrus. Report on the mound explorations of the Bureau of ethnology. Smithsn. Inst. Ann. Rpt. (1890/91)12: 1-742. 1894. 500 Sm63 v. 12.

In a section entitled Objections Answered, pp. 610-625, the author points out that the mound-builders and the Indians were agricultural people who depended largely for subsistence on the products of the soil, and upon corn in particular. This opinion is substantiated by numerous quotations from journals and writings of the early explorers and historians.

"Had it not been for the corn furnished this settlement in its early days by the Indians willingly or through force, there would be few if any descendants of the Pilgrim fathers to write their history or sing their praises." - p. 619.

"...the Jamestown colony depended entirely on the natives for corn during the first few years of its existence... In regard to the Gulf States east of the Mississippi and also Arkansas... Corn was grown everywhere in great abundance. De Soto and his Spanish followers, amounting at the outset to more than 600 men, 200 horses, and a drove of hogs, subsisted during the four years they were traversing the country almost wholly upon the products of the natives' fields. The amount of game taken during this time would scarcely have sufficed them for a single month." - p. 619.

The following statement is quoted from a section on similarity of habits and customs of Indians and Mound builders: "It is generally admitted that maize was their chief food product, but this is not left to inference alone, as there are proofs of it from the mounds. Not only are there prints of the cobs on many clay vessels, but lumps of clay bearing the impress of the ears; also charred cobs, ears, and grains have been repeatedly found in mounds." - p. 683.

354. Thomas, Cyrus. Who were the mound builders? Amer. Antiquarian 7(2): 65-74. Mar. 1885. Libr. Cong. E51.A51

"That the Mound Builders must have relied, to a large extent, upon agricultural products is conceded and that maize was their chief food plant is generally admitted; but this is not left to conjecture, as we have proof of it from the mounds and ancient works. Not only do we find the prints of cobs on many clay vessels, but lumps of clay which have been pressed around the ear of corn, and then burned, have recently been found by the agents of the Bureau of Ethnology in some of the Arkansas mounds... Charred ears, cobs and grains have been found in mounds and in pits or caches, which appear to be the work of the so-called 'Veritable Mound Builders.'" - p. 73.

355. Thompson, Charles Manfred, and Jones, Fred Mitchell. Economic development of the United States, a first course, 794pp. New York, The Macmillan co., 1939. 277.12 T37

Reading references, pp. 778-781.

Two short paragraphs on p. 24 are devoted to the importance of Indian corn to the early settlers. It is said that the first colonization schemes of the English and the conquest of the Continent by white

men would have been greatly delayed without it. Because it grows from the seed and reaches maturity during a single growing season corn was an excellent and easily raised food for the American pioneer.

356. Thompson, Edward Herbert. People of the serpent; life and adventure among the Mayas. 301pp. Boston and New York, Houghton Mifflin co., 1932. Libr. Cong. F1435.T483

"From these early Americans we have received at least one important utilitarian legacy. From the seeds of one of three species of native grasses the Mayas, by long-continued selection, evolved the grain we now know as maize or Indian corn. At a conservative estimate our corn crop today means an income of from $300,000,000 annually. In the course of an investigation conducted for the United States Government it found that there are in Yucatan nine varieties of corn, one large species with four varieties, and a small species of five varieties. It was the custom of the Mayas to plant the large species when the indications pointed to a normally damp season and the smaller species, which matures rapidly, when a dry season was in sight.

"It is an interesting fact that the corn which the Indians gave the Pilgrims to plant at Plymouth derived from Middle America by a devious course of barter among the aboriginal tribes. Evidence of its exotic origin is seen in Samoset's instructions to the white men to place a herring or a porgee in each hill of corn. Without some such artificial aid the seed would not germinate in the New England climate." - pp. 22-23.

357. Thompson, John Eric. Ethnology of the Mayas of Southern and Central British Honduras. Field Mus. Nat. Hist. Pub. 274. (Anthropol. Series, v. 17, no. 2), pp. 27-213. Chicago, 1930. Libr. Cong. GN2.F4

The milpa and its cultivation by communal labor are described in ch. 2, Agriculture at San Antonio. - pp. 41-55.

"The communal method of agriculture...is no longer practiced at Socotz. There the system is purely individualistic. Each family cultivates its own milpa, hiring outside labor at the rate of fifty cents a day when, and if, required." - p. 115.

The preparation of maize as food and drink is described. The origin of maize is briefly discussed on pp. 191-192. "Without this cereal it is doubtful whether any high state of culture would have been attained in the New World."

358. Thompson, John Eric. Mexico before Cortez; an account of the daily life, religion, and ritual of the Aztecs and kindred peoples. 298pp. New York, London, C. Scribner's sons, 1933. Libr. Cong. F1219.T46

Selected bibliography, p. 291.

"On the plateau country grew a wild grass known to the Aztecs as Teocentli, or 'food of the gods.' This was an apt name, for from it either by chance, or, more probably, by deliberate effort, maize was produced. Probably this came about through the germination of seed accidentally spilt out of the baskets of its gatherers, or by

faulty winnowing. Once the idea of planting seeds, instead of making long journeys in search of places where the plants grew wild, was taken up, selection of seeds would soon follow. This was the greatest stride ever made by man along the path of progress, for the cultivators were practically freed from the menace of starvation. The danger of overpopulation had practically disappeared, as now a much greater population could be maintained in the same extent of territory. By communal labor in the fields and the need for communal protection of the crops, the individual lost much of his independence and was welded more firmly into the community. This meant the emergence of civic organization. Finally leisure was born." - p. 10.

The clearing of the soil and preparing the milpa, the sowing of the corn and its harvesting and some of the ceremonies connected therewith are described. "The same method of preparing the milpas may be witnessed at the present time all over the tierra caliente of Mexico, Guatemala and Honduras." Maize, at the time of Columbus, is said to have been "cultivated from southern Canada almost without a break as far south as central Chile. Many varieties of maize were grown by the Mexicans, but in this respect they were outstripped by the ancient Peruvians." - pp. 62-65.

The method of preparing food and drink from maize is described on pp. 72-73. In some parts of southern Mexico "a round tower-like structure with walls of maize stalks was placed in front of the house to hold maize on the cob. Often another construction, shaped like a huge vase with swelling sides, served as a second granary, being employed to hold shelled maize." - p. 96.

"Those who were hungry were allowed to pluck two or three ears of corn as they passed the fields, but should a man take a large quantity of corn or maliciously uproot plants in the fields, he suffered death." - p. 109.

"In Texcoco the laws seem to have been more lenient...the theft of maize was not punished by death but by slavery." - p. 112.

The maize spirits are described on pp. 142-143 and feasts in honor of the maize gods, on pp. 180-181, 184, 186-188. A number of superstitions connected with the preparation of maize are noted on pp. 228, 229.

359. Thwaites, Reuben Gold, ed. Early western travels 1748-1846; a series of annotated reprints of some of the best and rarest contemporary volumes of travel, descriptive of the aborigines and social and economic conditions in the middle and far west, during the period of early American settlement. Edited with notes, introductions, index, etc., by Reuben Gold Thwaites. 32v. Cleveland, O., The A. H. Clark co., 1904-1907. Libr. Cong. F592.T54

Numerous references to corn these volumes may be found through consulting the index, v. 31, under the subject Corn (maize).

360. Tschudi, J. J. von. Travels in Peru, during the years 1838-1842. Tr. from the German, by Thomasina Ross. 506pp. London, D. Bogue, 1847. Libr. Cong. F3423.T89

The growth of maize in Peru and its use as food are noted. "Since the earthquake of 1687 the crops of maize on the Peruvian coast have been very inconsiderable. In the mountainous parts it is somewhat more abundant, but still far from sufficient to supply the wants of the country. Chile supplies, in return for sugar, the maize required in Peru." - pp. 176-177.

361. Underhill, Ruth Murray. The first penthouse dwellers of America. 155pp. New York, J. J. Augustin, [1938] Libr. Cong. E99.P9U3

Books on the Pueblos, p. 155.

The many photographs which illustrate the text are by Lilian J. Reichard.

According to this writer, the reason why these complicated civilizations developed in the desert land of Arizona and New Mexico is that maize could be grown there. "The answer is corn. People could live on that plateau only if they were farmers and had their food growing beside them. Food is the answer to most of the wanderings and the habits of early people at grips with nature. Where they have plenty of food they can settle down and build houses. Many families can live together instead of separating each to its own hunting field. Where many live together they can institute a government. They can plan ceremonies for all the year, knowing that all will be present to take part. So a whole civilization grew up on that tail of the Rockies called the Colorado Plateau, because corn would grow there." - p. 2. "Before 1 A. D. we only guess at what they could have been doing but after 1 A. D. - speaking in large round figures - they had corn. The discovery of the steam engine or of that far famed cotton jenny that industrialized England were not more epoch making. With corn Southwest history really begins. Trails are gradually being traced through Mexico, Texas and the Mississippi Valley to learn where that corn came from... The people got corn and the tale, as after an act of magic, proceeds at different tempo." - pp. 5-6.

Again and again, the importance of corn to the Pueblos is emphasized as the following quotations demonstrate: "Corn to the Hopi is the symbol of life, and corn thrice ground is the perfect food, perfectly prepared." - p. 39. "The Zuni do not seem bewildered by these changes, for they have the interest they have always had: crops. The colored corn, named for the six directions, has been not only a means of livelihood but a religion. It still is. Ground cornmeal is the Zuni sacrifice; a perfect corn ear is the badge of membership in a medicine society; corn ears lie beside the babies to protect them; and corn is still the staple food. Though the Zuni often fast for religious purposes, they never fast from corn which is life itself. They raise it in the same way that they always did." - p. 69. Because of the corn, people could settle and, because they were settled, they could weave cotton, paint delicate pottery, and gather month after month for ceremonies." - p. 131.

362. U. S. Commissioner of patents. Indian corn. U. S. Commr. Patents. Ann. Rpt., Agr. 1853: 96-102. Washington, D. C., A. O. P. Nicholson, printer, 1854. 1 Ag84 1853

Corn entered into the mythology and ceremonies of the Indian tribes, and one such story, showing the origin of corn from the Ojibway legends is quoted in this report. The author cites authorities to prove the American origin of corn. "But in this country, according to Garcilaso de la Vega, one of the earliest Peruvian historians, the palace gardens of the Incas were ornamented with maize, in gold and silver, with all the grains, spikes, stalks and leaves; and in one instance, in the 'garden of gold and silver,' there was an entire corn-field, of considerable size, representing the maize in its exact and natural shape; a proof no less of the wealth of the Incas than of their veneration for this important grain... It is, moreover, a well authenticated fact that maize was found in a state of cultivation, by the aborigines, on the island of Cuba, at the time of its discovery by Columbus, as well as in most other places in America first explored by Europeans." - p. 97.

The remaining part of the discussion deals with production, chemistry, and value of corn crops in United States.

363. Vance, Rupert B. Human factors in cotton culture; a study in the social geography of the American south. 346pp. Chapel Hill, The University of North Carolina press, 1929. (Univ. N. C. Social Study Ser.) 281.2 V27

Selected bibliography, pp. 321-337.

See pp. 297-298 for the use of corn for food by cotton growers and the basic diet of the negro cropper, the white tenant and the small cotton farmer which is salt fat pork, corn bread, and molasses. "Exclusive reliance on this diet impairs health and economic efficiency and thus may serve to cement the cotton farmer closer to his basic diet."

364. Van Hermann, H. A. El maiz. Notas progresivas e historicas. Cuba. Secretaría de Agricultura. Revista de Agricultura 22(7): 50-55. July 1939. 8 Ag83Re

According to the author a complete history of Indian corn would involve the history of several nations. He calls attention to the fact that the colonists near Plymouth would have died of hunger had the Indians not shown them how to plant corn. It was Indian corn that made it possible for explorers to extend the frontiers by fighting and to defend themselves against the red man. Scientists and historians are said to attribute the mysterious extinction of the Mayan nation of Central America before the advent of the white man to the failure of the maize crops due to soil erosion and climatic changes, etc.

365. Verrill, Alpheus Hyatt, and Barrett, Otis Warren. Foods America gave the world. The strange, fascinating and often romantic histories of many native American food plants, their origin and other interesting and curious facts concerning them. 289pp. Boston, L. C. Page & co., [1937] 452.8 V61

The first 3 chapters, pp. 1-24, are devoted to maize. An account of its probable origin and manner of cultivation, its place in the legends and religious ceremonials, its role in the development and settling of our country, in creating wealth and industries, and its contribution to civilization is given.

"But it was among the cultured or civilized races, the Aztecs, Mayas and Incas, that the corn was regarded with the greatest reverence, and the most impressive and elaborate ceremonies connected with it were held.

"To these highly cultured people corn was literally the 'breath of life' and it is no exaggeration to state that their entire civilization, their very existence and their accomplishments were indirectly dependent upon corn. Without corn their teeming populations could not have survived, their great cities would have been impossible, they could not have maintained armies for defense and conquest, and they could not have progressed and attained the high degree of culture, performed the amazing engineering feats, developed arts and crafts and the astronomical knowledge which they possessed.

"Without a staple food crop capable of providing sustenance for millions of human beings, a civilized state is impossible, and the only American crop which would answer the requirements for developing a highly organized and advanced culture was corn. Hence it is not surprising that among these races where everything in life was connected with corn, maize should have been highly reverenced and even held sacred, that there should have been corn gods and sacrifices to corn, temples dedicated to corn, and elaborate ceremonies connected with the planting, cultivation and harvesting of corn." - pp. 11-12.

"Although the Peruvian Indians possessed a far greater number and variety of food plants than any other American race, yet corn was their most important crop...their staff of life was maize. It was the one crop which could be stored and kept indefinitely, it contained more nourishment for its bulk than any other vegetable food and hence was the ideal ration for armies on the march and for travelers on long journeys. It could be grown in practically every portion of the land, and its grains, its husks, its leaves and stalks all served the people in a multitude of ways. Without corn it would have been impossible for the country to have supported the millions of inhabitants who comprised the empire of the Incas. Without their store of corn the armies of the Inca could never have traversed the Andes and the deserts to subjugate distant tribes and extend the domain of the Incas for thousands of miles north and south, until it became the greatest empire in the world at the time with the most advanced and highly developed civilization in all the New World.

In fact it is no exaggeration to state that the Incan empire and the Incan civilization were founded and maintained upon corn. No wonder the people felt that maize was the 'grain of the gods.'" - pp. 16-17.

"Just as the civilizations of the Incas, the Mayas and the Aztecs were dependent upon corn, so our own civilization, the conquest and the settlement of our country, were largely made possible by maize. When the English colonists at Jamestown in Virginia were faced with famine and starvation it was corn, traded from the Indians by Captain John Smith, which saved the colony and led to the permanent settlement of Virginia. When the Pilgrims at Plymouth found themselves foodless and all hope seemed lost, it was the discovery of corn cached by the Indians in pots and baskets in their fields which enabled the little band of British to survive. And when the hardy pioneers pushed westward across the Alleghenies, the corn and corn fields of the Indians provided the trespassing white men with food and resulted in the vast corn belt of the Middle West of today." - p. 18.

"Truly we owe the Indians a debt which we can never repay for having given us the maize, for corn has not only proved an inexhaustible source of nourishing food in itself, the means ef fodder to provide us with cattle and swine, and incalculable riches, but in addition it has given us a vast number of useful and essential articles the manufacture of which has led to the establishment of great factories and mills and countless industries." - p. 22.

366. Wallace, Dan A. Ancient American agriculture; The old-time search for rural security. The Farmer 56 (15): 5, 17. July 16, 1938. 6 F2211

The writer tells of his visit to the Indians of the Southwest, and records something of their agriculture and modes of living. He tells about the many food plants for which the white man is indebted to the red, among which is Indian corn, "a priceless gift to civilization."

367. Wallace, Henry Agard. The civilization of corn. Palimpsest 11(7): 269-281. July 1930. Libr. Cong. F616.P16

This article includes a tribute to the early Indian corn breeders.

"But no matter how much the white man may accomplish in rearranging the corn genes, he may well remain humble as he contemplates the accomplishments of the corn breeders of ten thousand years ago. Corn has done more for the white men of Iowa than the white men have done for corn." - p. 280.

368. Wallace, Henry Agard, and Bressman, Earl N. Corn and corn-growing. Ed. 4, completely rev. 436pp. New York, J. Wiley & sons, inc.; London, Chapman & Hall, ltd., 1937. (The Wiley farm series) 59.22 W152

Selected list of references, at end of each chapter.

Among the 27 chapters of this text book the following are of particular interest: XVIII. History and importance of corn; XIX. Competing corn-growing regions; XXI. Economic facters affecting corn production; XXV. Commercial products of corn; XXVII. Corn statistics.

The following extracts are quoted from Ch. XVIII, History and Importance of corn:

"The most important history of corn in this country, as far as the white man is concerned, began with the settlement of Jamestown in 1607. The colonists had a hard time to keep from starvation; and had it not been for the corn obtained from the Indians, the colony would probably have resulted in failure...

"Corn formed such an important crop with these colonists that many laws were passed regulating the minimum amount to be grown and the methods of caring for it." - pp. 265-266.

"The value of corn in the agriculture of the United States is well known. In acreage, in multiplicity of uses, in production and in value, it exceeds any other cultivated crop...

"Valuable as a sustainer of life among primitive peoples in peace and war, corn, ever since the early days of the Jamestown and Plymouth colonies, has bulked large in the white man's existence on this continent...

"Corn is the basis of wealth in the agricultural region known as the Corn Belt." - p. 269.

"It is corn that enables these middle-western states to produce such a surplus of pork and beef. The good homes, high land values, and prosperity of the Corn Belt are a direct outsome of the wealth that the corn crop brings to this region. The corn crop of the Corn Belt is the world's greatest bulwark against famine. In times of need, a part of the crop may be diverted from its customary use as an animal food to its more economical use as a human food." - p. 270.

369. Wallace, Henry Agard. Corn breeding experience and its probable eventual effect on the technique of livestock breeding; Sprague memorial lecture...at Michigan State college, East Lansing, Michigan, April 21, 1938, 8 P. M., E. S. T. 22pp., processed. [Washington, D. C.] U. S. Dept. of agriculture, 1938. 1.9 Ag8636 [no. 187]

For the contribution of the Indian see pp. 1-3.

370. Ward, Sir Henry George. Mexico in 1827. 2v. London, H. Colburn, 1828. Libr. Cong. F1213.W25

"There are few parts, either of the Tierra caliente, or of the Table-land, in which Maize is not cultivated with success... In some particularly favoured spots, it has been known to produce eight hundred fanegas for one sown; and wherever irrigation is practicable, from three to four hundred for one is the ordinary ratio of increase. Where the crop depends upon the season, it is more variable...

"The great majority of the inhabitants of New Spain subsists almost entirely upon maize flour...

"The price of maize varies with the year, and the distance from the principal markets. In the capital, I have seldom known it lower than two dollars the fanega (of 150 lbs.); but it sometimes rises to three and a half, as was the case a short time before my departure from Mexico (April 1927)... In the interior, from three to four reals (of eight to the dollar) is the ordinary price; but in 1826, it rose to two dollars, and two and a half; to the great distress of the Indian population...

"Some idea of the consumption in the mining districts may be formed by the fact, that, in Guanajuato alone, fourteen thousand mules were in daily use, all of which were fed on maize, straw and zacate, the maize-stalk dried, of which all animals are fond. There was a similar demand...around each of the other mining towns, so that the agricultural prosperity of the country depended in a great measure upon the prosperity of the mines; while the labours of the miner, on the other hand, were never carried on with such facility, or to such an extent, as when a succession of favourable years, by placing an abundant supply of agricultural produce, at moderate prices, within his reach, enabled him to augment his establishment in such a manner as to reduce even the poorer ores with profit. A great rise in the price of maize affected the mining interests almost as much as a rise in the price of quicksilver; and, were a table drawn up of the years most productive in mineral riches, they would be found to tally exactly with those which are recorded as most abundant in the agricultural annals of the country...

"Before the conquest [the Pulque de maiz] was condensed by the natives, and used as sugar." - v. 1, pp. 41-44.

371. Warren, George Frederick. Elements of agriculture. Rev. ed. 549pp. New York, London, The Macmillan co., 1926. (Rural text book series) 30.2 W25E 1926

A section, pp. 168-195, in the chapter on Grain Crops is devoted to corn - chiefly to its cultivation, harvesting, etc. - but the following statements on its importance are of particular interest:

"The Indians had grown it for many centuries before America was discovered and were raising better crops of corn than some farmers now raise. They taught the first settlers how to grow it. Had it not been for the corn that the Indians shared with them, many more would have died of famine. Had it not been for corn, the settlement of the Middle West would have been long delayed. Had it not been for the increased wealth and population of the North, which was due to corn, it is possible that the Civil War might have ended differently. Corn and cotton have had more to do with the history of America than has 'taxation without representation.' In fact, there would have been few people to tax at the time of the Revolution had it not been for these crops." - pp. 168-169.

372. Waugh, Frederick Wilkerson. Iroquois foods and food preparation. Canada. Geol. Survey. Memoir 86 (Anthropol. Ser. no. 12), 235pp. Ottawa, Govt. printing bureau, 1916. 408 C16Me no. 86

The agricultural methods of the Iroquois, their cookery and eating customs and food materials and recipes are described in this bulletin. The mainstay of their agriculture was corn, and its planting, cultivation, ceremonials, harvesting, storage and cookery are told in detail. The following excerpt is taken from pp. 16-17:

"Indian agriculture evidently had a most important bearing upon the struggle of the early colonists. In most cases starvation would have ensued without the supplies either purrhased or stolen from the Indians, and even at a later date, when the stability of the settlements was assured, the colonists were glad to adopt the cultivation of corn and other native products."

373. Weatherwax, Paul. The story of the maize plant. 247pp. Chicago, Ill., The University of Chicago press [1923.] (The University of Chicago science series) 59 W37

Bibliography, pp. 226-235.

In his introduction, the writer states:

"The maize plant was the economic stepping-stone of the colonist in temperate North America, and the banner of the immigrant as he made his way into the Mississippi Valley; and today the Corn Belt is the land of rationalism, prosperity, and happiness - the social and economic bulwark of the nation." - p. 2.

The last 3 chapters of the book are of particular interest, and are entitled Products and Uses, Maize in Aboriginal America, and Maize in American Life, pp. 186-225.

"The maize area most influential in the colonization and development of America comprised all that section of the United States east of the arid plains region, and extended in some places as far as 50 miles into Canada. Hunting and agriculture were the dependable occupations. Maize was the chief staple food plant... Early explorers tell of vast areas planted in maize and estimate in millions of bushels the amounts of grain stored in the largest villages. These communities were the centers around which a degree of civilization the equal of that of Mexico or Peru would doubtless have developed had the white man delayed his coming a few centuries longer...

"Indian myths of the creation, the deluge, and the origin of civilization abound in tributes to the part played by maize, and this plant is the subject of every legend that attempts to explain the beginnings of agriculture." - p. 199.

"Another tradition of the Mayas makes corn the very breath of life that was breathed into man. Made of earth, he was without life; but, by means of maize, he was converted into flesh and blood." - p. 200.

"Some of the most stupendous feats of engineering accomplished in prehistoric America, or anywhere in the ancient or medieval world, were connected with the growing of maize.

"The simplest engineering projects were the 'garden beds' of the Mississippi Valley. In the tough sod of the prairies of southern Michigan and Wisconsin and northern Indiana are still to be seen ridges and mounds used for growing corn in ancient times." - p. 207.

In order to be safe from their enemies, the Aztecs made islands in the lakes of Central Mexico, where they had tiny huts and patches of corn.

In the desert valleys of Peru and Chile, the natives dug pits 20 or more feet deep so as to reach the moist and fertile subsoil where they grew maize without the necessity of irrigation.

"But surpassing all other feats of engineering undertaken by the Indian, and making no mean showing beside similar works of the present day, were the gigantic irrigation projects of ancient Peru. The valleys and mountain sides of many parts of the Andes have only a scanty rainfall irregularly distributed; and, to secure a dependable supply of moisture for his cornfield, the Inca and his neighbors built

aqueducts hundreds of miles in length, bridging streams, and tunneling mountains, and doing the work so well that it stands in serviceable form in many places today. Irrigation was also extensively practiced in Mexico.

"All these massive works of the past stand today as mute witness of the part that the maize plant played in the life of the native American. It was not only important enough to call forth this stupendous effort, but it also provided food in sufficient abundance to release enormous numbers of laborers for public works of this kind." - pp. 208-209.

"Though the Indian was fully aware of the substantial way in which maize supplied some of his fundamental needs, yet his keenest sense of pleasure came from the drinks that it afforded. These he had in almost endless variety... The most popular of the fermented drinks was chicha, which was widely known in many forms." - p. 211.

"The Indian's religion was closely linked with his daily life. His gods were personifications of the natural forces that he saw at work about him, and at whose mercy he felt himself to be...

"Since maize was one of his greatest blessings, it must itself be the work of a deity, but many other deities were necessarily connected with its existence. Consequently, parts of the maize plant, and symbolical idols designed after parts of it, played important parts in the numerous ceremonies connected with the manipulation of the crop." - p. 212.

"In the sacred architecture and art of the Indians, maize had a deserving place of prominence, being both artistic and worthy of veneration. The best examples of this use of the plant were found in the temple at Cuzco, the most magnificent in Peru." - p. 215.

"But now, that he is passing from the scene, what has been the Indian's contribution to civilization?...but his great and enduring gift to the whole world was maize. This plant he took from vegetable barbarism and made of it the aristocrat of the cereals; and today it feeds a large proportion of the world's population, and is the basis of the life and prosperity of the great nations of America as truly as it ever was in the brightest days of Aztec or of Inca." - p. 216.

"As a factor in the economic life of the greatest of the nations that have grown up in the homeland of maize, this plant and the industries that are based upon it are of supreme importance. It is but a fulfilment of our expectations, then, to find on analysis of our modern national life that the maize plant is inseparably interwoven into the spirit of America." - p. 217.

"On down through the years of colonial life, and through the period of expansion and development of the young republic, maize has continued to be the key to opportunity...

"The grower of maize is today in a position to enjoy a large degree of independence...

"Mention of the Corn Belt suggests large, prosperous, well-stocked farms, substantial buildings, good roads, good schools, churches, colleges, and universities, and clean, orderly towns and cities as

commercial centers. It is a land of prosperity, intelligence, and contentment. Many of these blessings may be attributed to the innate temper of the pioneers in this region, but to the peculiar requirements and advantages of the corn industry must go much credit for the qualities that make the Middle West the embodiment of the best that there is in the ideal Americanism.

"Certain steps in the manipulation of the crop have contributed to the long list of social occasions that have had so much to do with the shaping of American ideals. In earlier days the logrollings and quilting bees were varied in season with an occasional husking bee. Some corn was usually husked on these occasions, but this was not necessarily all the good that came out of the event. It afforded one of the few opportunities in those days for social intercourse and fostered the formulation and development of fundamental political and economic policies. Many a colonial romance, too, had its beginning in the finding of a red ear of corn by some novice too timid to make a start unaided." - pp. 218-219.

"Maize has ornamental properties that will in time give it a place in decorative work. It has already been utilized in the commercial world in this way, having been worked into some attractive advertising designs. In fairs and expositions, also, the ears and grains have been effectively used in symbolical decoration." - p. 220.

"The poet and the essayist have made more extended use of the material offered them, and the literature of the world is richer by many a gem whose theme is the sentimental appeal of maize. Both the lore of the Indian and the beauty and fragrance of the prairie cornfield of today have done their part in the way of inspiration.

"In the well-known 'Song of Hiawatha,' Longfellow has immortalized many sketches of the life of the North American Indian. Among these is an account of the manipulation of the maize crop by Hiawatha." - pp. 221-222.

374. Webber, Herbert J., and Bessey, Ernst A. Progress of plant breeding in the United States. U. S. Dept. Agr. Yearbook 1899: 465-490. 1900. 1 Ag84Y 1899

The following quoted from p. 467 is part of a section entitled Early Agricultural and Horticultural Conditions: "Some of our now most important agricultural crops, like corn and tobacco, are native American plants, and their main improvement consequently dates from the discovery of America. In some places, however, the Indians had developed a comparatively high state of agriculture, and many sorts of such native cultivated plants were obtained from them, as, for example, the Golden Sioux, King Philip, and Tuscarora races of field corn. An early sweet corn is also recorded as having been obtained from the Indians. According to one account it was found and introduced into Connecticut by an officer in General Sullivan's expedition against the Indians in the Genesee country in 1779. According to another account it was introduced into Massachusetts by Capt. Richard Bagnol, of Plymouth, who obtained it from the country

of the Susquehanna on his return from the Sullivan expedition. The Six Nations, against which the Sullivan expedition was sent, had made considerable progress in agriculture, and are known to have cultivated large fields of corn."

375. Wedel, Waldo Rudolph. An introduction to Pawnee archeology. Smithsn. Inst. Bur. Amer. Ethnol. Bul. 112, 122pp. Washington, D. C., 1936. 500 Sm63B no. 112

In a section entitled Foods: Agriculture, pp. 57-62, the writer presents material on corn, from which the following is quoted:

"The food complex of the Pawnee centered about two staples, viz, maize and the bison. Since the two were very nearly equally stressed, though conducive to wholly dissimilar habits of life, they were directly responsible for many of the varied elements of Pawnee culture. Thus they make the people alternately roving hunters and settled agriculturists, and led, correspondingly, to the use of two entirely distinct house types, of the cache, and of numerous other traits. It was to this combination of hunting with horticultural life that much of the richness of Pawnee culture is due.

"The Pawnee were essentially a corn-growing people. Corn was their Mother; it figured in their rituals and in their mythology, even more prominently than did the bison... The most important ceremonies, including the sacrifice of a maiden to the Morning Star by the Skidi, were directed as much toward securing a bountiful corn crop as toward success on the bison hunt."

376. Weeden, William B. Economic and social history of New England, 1620-1789. 2v. (964pp.) Boston and New York, Houghton, Mifflin and co., 1891. Libr. Cong. F7.W382

Numerous references to corn in these volumes may be found through the index in v. II. Among the items referred to are the following:

The use of grains of corn to tally the calculation is mentioned on p. 37.

The debt of the early settlers to Indian corn and fish is brought out on pp. 88-90.

The early trade in corn is discussed on pp. 93, 95, 97 and 98.

"Maize furnished not only food, but a currency for carrying on the internal trade. In October the Court passed an ordinance that it be received in payment for debts, unless money or beaver was named in the contract." - p. 101.

"The planting of Indian corn was their first and most pregnant industry." - p. 115.

Corn in the regulation of trade by the early legislators is discussed on p. 119.

In 1776 and 1777 molasses was manufactured from cornstalks because of the scarcity of sugar.

377. Wtellsı, C. W. Will corn become the base food? Pan Amer. Union Bul. 46(4): 483-490. Apr. 1918. 150.9 M76

The wheat shortage during war time led to this consideration of corn as a substitute in bread making. Wheat has supplanted corn as a

human food among the majority of inhabitants of North America, but wheat has not actually replaced corn, for the cultivation of corn has increased faster than that of wheat.

Although the people of the United States grow more corn than wheat, they do not eat nearly as much. If some method of leavening corn bread could be found, it would undoubtedly replace wheat to a large extent in the diet. The author's concluding paragraph reads as follows:

"Corn and hay are the bases of nearly all agriculture in the United States. Corn becomes a like base wherever it is cultivated. Our farming is built upon corn. The production of all food animals and their by-products, wool, hides, etc., depends upon corn. The farmer's work animals live upon corn and hay. Even the production of other grains depends upon the corn crop. Although we do not eat much corn we and a large part of the world would starve were it not for this most beneficent and valuable grain. The one thing needed is the discovery of how to make bread of it." - p. 490.

378. Wenz, Alfred. In the heart of the corn country. Dakota Farmer 36(20): 1068-1070. Oct. 15, 1916. 6 D14

The writer describes his journey through the Dakotas to the Fort Berthold Reservation and on down the river, and gives a picture of the Indian life that preceded the white man's coming to these peaceful tribes along the Missouri. They were agriculturists and grew several varieties of corn, which was not only their food, but the center of their religious life and thought.

"But for centuries corn has been the staple crop. What wheat is to us, corn was to the Indians who lived in this valley on the upper Missouri... Not long after the Revolutionary War, the Lewis and Clark Expedition wintered near one of their villages. These explorers were nearly destitute of food, and had it not been for the corn they were able to obtain from the Indians, would have been compelled to turn back and abandon their historic journey till they could outfit again in St. Louis with the result that the territory now comprising Idaho, Washington, and Oregon would have likely become a part of the British Empire instead of states in our Union." - p. 1068.

379. West, Geo. A. The Indian authorship of Wisconsin antiquities. Wis. Archeol. 6(4): 169-256. Oct.-Dec. 1907. Libr. Cong. E78.W8W8

Explanation of reference notes, pp. 254-256.

Aboriginal agriculture, pp. 190-195. Quotes various authorities as to the cultivation of corn and other crops by the Indians.

380. Whitbeck, R. H., and Finch, V. C. Economic geography. Ed. 3. 565pp. New York and London, McGraw-Hill book co., inc., 1935. 278 W58

General references, pp. 534-537.

References at end of chapters.

Corn as an American crop, corn climate, the American corn crop, economic factors in corn production, uses of corn, commerce in American corn, and important relatives of corn are discussed on pp. 39-45.

The following is quoted from p. 39:

"Corn played an important part in the early settlement of North America... With the continued development of American agriculture, corn has declined in relative importance as a direct source of human food. As a field crop it has, however, maintained first rank in quantity of grain produced and in the total value of its products. North America grows more than 60 per cent of all the corn of the world, most of it in the United States."

381. White, C. Langdon, and Renner, George T. Geography; an introduction to human ecology. 790pp. New York, London, D. Appleton-Century co., inc. [1936] (Century earth science series. K. F. Mather, ed.) 278 W582

The effect of corn agriculture on the people of the Cumberland and Ozark hill country is brough out on pp. 361-362, and 367.

382. Whymper, Edward. Travels amongst the great Andes of the equator. 456pp. New York, C. Scribner's sons, 1892. Libr. Cong. F3741.A6W6

"Amongst the distinctly ornamental objects in stone there are imitations of maize-heads. These were particularly mentioned in Juan & Ulloa's work, nearly a century and a half ago, and seem to have been better known at that time than they are at present. The Spanish writers say:- 'The maize has ever been the delight of the Indians; for, besides being their food, their favourite liquor chicha was made of it; the Indian artists therefore used to show their skill in making ears of it in a kind of very hard stone; and so perfect was the resemblance that they could hardly be distinguished by the eye from nature; especially as the colour was imitated to the greatest perfection; some represented the yellow maize, some the white... The most surprising circumstance of the whole is the manner of their working, which, when we consider their want of instruments and the wretched form of those they had, appears an inexplicable mystery."

383. Wiener, Charles. La République Argentine. 677pp. Paris, Librairie Cerf, 1899. ([France] Ministère des Affaires Étrangères. Missions Commerciales) Libr. Cong. F2808.W64

Bibliographie, pp. 644-661.

Contains a brief section on maize in which it is stated that, while the Indians cultivated maize solely for their own consumption, the Spaniards realized its value as an export product. Its export began long before that of wheat. Statistics are given of area sowed in 1881, 1888, 1890, 1895, price paid to producer, and quantities exported from 1876 to 1886.

384. Wiener, Leo. Mayan and Mexican origins. 203, cxxvipp. Cambridge, Privately printed, 1926. Libr. Cong. F1435.3.P6W5

Ch. X is The Philological History of Maize, pp. 106-120. Maize is said to have been identified by Columbus and Peter Martyr with panicum, by Barros with maçorca, and by Sousa with zaburro.

385. Wiley, H. W. The relation of chemistry to the progress of agriculture. U. S. Dept. Agr. Yearbook 1899: 201-258. 1900. 1 Ag84Y 1899

On p. 209 the writer quotes from Governor Bradford's History of Plimouth Plantation; George Mourt's Relation; or, Journal of the Beginning and Proceedings of the English Plantation Settled at Plimouth, in New England, by certain English Adventurers, Both Merchants and Others; Thomas Morton's New England Canaan; and from the records of the town of Ipswich, Mass., of May 11, 1644. These extracts refer to the use of fish as a fertilizer in growing corn. The quotations from the town records of Ipswich tell of the fine assessed any man whose dog was "found scraping up fish in a corn field."

386. Wilkinson, Albert E. Sweet corn. 203pp. New York, Orange Judd co.; London, Kegan Paul, Trench, Trübner & co., ltd., 1915. 59 W65

Ch. II, pp. 3-7, gives an account of the history of sweet corn.

Ch. XXIV, pp. 158-161, tells of the history and importance of canning. Half of the chapter is quoted from a statement by the United States Bureau of Chemistry, which says that Isaac Winslow of Maine, sailor by occupation, first began experimenting with the canning of corn in 1839 and applied for a patent on his method in 1843. The patent was not granted until 1862.

387. Will, George Francis, and Hyde, George E. Corn among the Indians of the upper Missouri. 323pp. Saint Louis, Mo., The William Harvey Miner co., inc., 1917. (Half-title: Little histories of North American Indians, no. 5) 59 W66C

The entire volume relates to Indian corn culture. Titles of the eight chapters are: I. The Upper Missouri Indians. II. Planting and cultivation. III. Harvest. IV. Corn as food. V. Corn as an article of trade. VI. The sacred character of corn. VII. Corn ceremonies. VIII. Varieties.

The various customs among the several tribes of the Upper Missouri relating to the planting of corn, its cultivation, harvesting, uses as food, as article of trade, and its sacred character, and use in corn ceremonies are described.

"Most of the early explorers who journeyed through the Upper Missouri country during the eighteenth and nineteenth centuries have mentioned in passing the agriculture of the tribes of this region." - p. 60. Their chief staple products were corn and beans.

"The corn raised by the agricultural tribes of the Upper Missouri was an important source of food not only to the raisers themselves but to the nomadic tribes of hunters who surrounded their villages on all sides, and also to the early white explorers and traders who penetrated this region.

"To the agricultural tribes themselves the corn was not only an important article of food from day to day; but the large stores of grain which they usually had on hand rendered the people more or less independent of the wandering buffalo herds, and insured them against famine, especially during the long, hard winters.

"There can be little doubt that, in the time before horses and firearms were acquired, agriculture must have played a much more important part in the economy of the Upper Missouri tribes than it did later." - p. 144.

"Besides their trade with the tribes in the Plains, the agricultural tribes of the Upper Missouri early developed a trade in corn and vegetables with the white traders and explorers. To the Indians this trade was certainly a great benefit, as it enabled them to procure much-coveted articles of European make; on the other hand it seems highly probable that the white explorers and traders would have found it impossible to carry on their operations without the supplies of food obtained from the village Indians. That this trade was established with the first coming of the whites and that it grew to large proportions may be easily demonstrated." - p. 191.

"That this dependence of the fur-traders upon Indian corn was not confined to the posts in the immediate neighborhood of the agricultural villages, but that large quantities were shipped to the more distant posts on the Missouri and Yellowstone is evident from the references we find to such shipments." - p. 195.

Throughout the volume, the authors use numerous quotations from the writings of Henry Verendrye, Lewis and Clark, Bradbury, Catlin, Schoolcraft and others to substantiate their conclusions.

388. Will, George Francis. Corn for the Northwest. 158pp. St. Paul, Minn., Webb book publishing co., 1930. 59 W66Co

References, pp. 154-156.

This volume deals with corn culture in the northwestern states and the prairies of Canada, and covers such phases as regional adaptability, soils, corn varieties, breeding, cultivation, and harvesting. Ch. III, Brief History of Corn Growing, pp. 18-22, and Ch. V, History of Aboriginal Corn Growing in the Northwest, pp. 29-34, are of particular interest.

"The corn plant and its cultivation are the foundation upon which aboriginal American culture has been builded even more than the wheat plant has served as the basis for European culture...

"Recent discoveries and research have demonstrated that there was in Yucatan and Guatemala 2,500 years ago a high American civilization, that of the Mayan Empire. The savants of the day had progressed so far on the road of learning that they had developed mathematics and astronomy to a point where they were able to work out a calendar system somewhat more accurate than our own. Architecture, sculpture, and painting had reached a position comparable in many respects to that of Egypt a thousand years before; gold, silver, and copper were known and used; government was highly developed; a most complex social system had grown up; and the whole structure was founded upon a permanent agriculture wherein cultivated and highly developed varieties of corn played the principal part. Corn as the symbol of agriculture figured in their religious ceremonies and in their religion itself, and its image is frequently met with in the tremendous volume of carved stone which remains to tell the tale of vanished glory...

"We know that the cultivation of corn in many varieties had spread from Mexico down through the cultures of western South America, so that corn was the most important agricultural product in Colombia, Ecuador, Peru, and Bolivia; that it had spread out into eastern South America from Venezuela to Argentina, and had been carried into the West Indies; and that it was a staple crop among the famed seven cities of Cibola and among all the pueblos and cliff dwellings of our own Southwest. And it had spread northward into Utah, Colorado, and Nevada, where remains of several varieties of corn are found in the ancient mounds and house remains of the cultures which preceded the cliff dwellers...

"On to the eastward the corn had traveled...

"Throughout our southern states from Texas and Missouri to the Atlantic corn was the most potent agricultural feature... Northward corn had spread into the St. Lawrence Valley especially among the Iroquois, and east into the New England states. The mound builders of Ohio had a complex corn culture as had the people who built the mounds of Illinois and Wisconsin. In the very early remains of Nebraska which antedate those of any known tribe, kernels and cobs of corn are found among the ashes of the fireplace.

"And all this that we have detailed had happened before the ships of Columbus ever landed. Peoples and cultures had been born, risen to power and faded over most of America and all had known, had used, and had glorified corn." - pp. 18-22.

389. Will, George Francis. Early corn culture by the Mandan Indians in the Northern Plains area. 5pp. [n.d.] 59 W66

Photostat copy of typewritten manuscript.

A description of the old corn culture in the higher plains area of North Dakota, including extent and modes of cultivation, storage, harvesting, place in mythology and importance to the people. In referring to the tribal rituals which held such a significant place in the social organization, the writer states: "The fact that any specific thing is the center for a group of such ceremonies and ritual procedure proves the great material as well as religious importance of that article in the tribe...

"In view of the many stories, myths, and ceremonials dealing with the corn and of the importance of the corn priest in the tribe, as well, it seems almost compulsory to believe that corn was, in the old days, before the coming of the horse, the chief article of sustenance for the Mandan people. When we remember that in those days there were said by one of their early visitors to have been from thirty to fifty thousand individuals belonging to the tribe, we must conjure up a picture of the Missouri River Valley in North Dakota and especially in the vicinity of the heart of Heart River, as a broad region of waving corn fields such as has even yet not been duplicated by the white settlers." - pp. 4-5.

390. Will, George Francis. Indian agriculture at its northern limits in the great plains region of North America. Rio de Janeiro, Imprensa nacional, 1924. Libr. Cong. E98.A3W63

"Separata dos Annaes do XX Congresso Internacional de Americanistas, Rio de Janeiro, Brasil. 20 a 30 de agosto de 1922," pp. 203-205.

Stresses the debt owed by the agriculturists of the Great Plains to their Indian predecessors for their agricultural accomplishments. Among these is the acclimatization of maize. "What this accomplishment is should be more clearly understood. Definitely, maize or corn, growing to a height of ten and twelve feet, requiring a growing season of 130 to 200 days, killed by the barest touch of frost, and stagnating if the temperature fell below 60° Fahrenheit was gradually transformed into a tough, hardy, compact plant, attaining a height of from three to four feet, requiring a growing season of not over 60 days to mature seed, and showing some frost resistance and a great deal of cold resistance, as well as marked resistance against wind and drought...

"The corn from the Canadian Reserves, undoubtedly the earliest and hardiest of all, seldom grows over three feet high, and plants bearing mature ears have been observed, when exposed to especially severe conditions of drought, having a height of not more than 15 inches, with the ear perhaps two to three inches long, but with perfect, fully developed grain upon it. Contrast this with the twelve foot plant raised by the Indians and whites of the lower Mississippi Valley and the agricultural accomplishments of the North American Indian seem to take rank perhaps even above those of our European ancestors in developing wheat, rye and barley."

391. Will, George Francis, and Spinden, H. J. The Mandans: a study of their culture, archeology and language. Peabody Mus. Amer. Archeol. and Ethnol. Harvard Univ. Papers 3(4): 81-219. 1906. Libr. Cong. E51.H337

This is a study of the life and culture of the Mandans in North Dakota where they probably began to settle in the fifteenth century. They are said to have been an agricultural people who raised large quantities of produce from crudely tilled plots of land, most of it being stored in caches. "Maximilian says that there was often from five hundred to eight hundred bushels of corn, alone, in the village... The supply was large enough so that it was not only eaten by the people, but in the winter was sometimes fed to the horses."

The methods of cultivation are described. Corn is said to have surpassed the rest of the crops in importance. "It was a small variety, five or six feet high, but was not the common, mottled 'Squaw corn' found in the region later. Maximilian enumerates seven distinct sorts... Corn was eaten as succotash with beans, boiled as hominy, ground up into coarse flour and made into cakes, and also as a sort of gruel and in several mixtures with wild fruit."

One of the premarriage customs was for the girl to cook corn each day for a certain number of days and to carry it to the young man's house.

Corn remains were found in the excavations made by the authors. These were "mostly of cobs, from which the grain had been cut off, leaving only an occasional kernel." A few had the kernels and part of the husk intact. "The cobs were all charred and occurred in layers in the mounds and at times in the caches, being often mixed with the remains of burnt sunflower and other seeds. The cobs were seldom over six inches long and many were smaller. They seemed to be of two types, a long and thin cob, and a shorter, rather thick cob." The types of kernels, the numbers of rows and their regularity or irregularity are noted.

392. Willoughby, C. C. Houses and gardens of the New England Indians. Amer. Anthropol. 8(1): 115-132. Jan.-Mar. 1906. Libr. Cong. GN1.A5

The section on gardens, pp. 128-132, contains considerable information on the cultivation, harvesting, and caching of corn and amount of land devoted to its culture by a single family.

393. Wilson, Gilbert Livingstone. Agriculture of the Hidatsa Indians; an Indian interpretation. Minn. Univ. Studies in the Social Sciences, no. 9, 129pp. Minneapolis, 1917. 31.1 W69

In his introduction to this thesis for a Ph. D. degree, Dr. A. E. Jenks writes that the study has unexpectedly uncovered drought-resistant varieties of maize which will be of great agricultural value to the semi-arid regions west of Minnesota.

Ch. IV, pp. 22-67, contains a detailed description of planting, cultivating, harvesting, uses, varieties, etc., of corn as told by an Indian woman of the Hidatsas, including her philosophy and economic interpretations.

394. Winship, George Parker. The Coronado expedition, 1540-1542. Smithsn. Inst. Bur. Ethnol. Ann. Rpt. (1892/93) 14(1): 329-613. Washington, D. C., 1896. 500 Sm63 v. 14, pt. 1

List of works useful to the student of the Coronado expedition, pp. 599-613.

Among the documents and letters which make up the account of the expedition is a translation of the narrative of Pedro de Castañeda - Account of the Expedition to Cibola, Which Took Place in the Year 1540, in Which All Those Settlements, Their Ceremonies and Customs Are Described, pp. 470-546.

"The country is a valley between rocky mountains. They cultivate corn, which does not grow very high. The ears start at the very foot, and each large fat stalk bears about 800 grains, something not seen before in these parts." - p. 518.

"...the fields are covered with corn which they have not been able to finish gathering." - p. 521.

"They keep separate houses where they prepare the food for eating and where they grind the meal, very clean. This is a separate room or closet where they have a trough with three stones fixed in stiff clay. [The grinding process is then described.] They grind a large

quantity at one time, because they make all their bread of meal soaked in warm water, like wafers." - p. 522.

Another document in this collection is Translation of the Letter from Coronado to Mandoza, Aug. 3, 1540, pp. 552-563, from which the following extract is quoted:

"The food which they eat in this country is corn, of which they have a great abundance, and beans, and venison... They make the best corn cakes I have ever seen anywhere, and this is what everybody ordinarily eats." - p. 559.

395. Wissler, Clark. Aboriginal maize culture as a typical culture-complex. Amer. Jour. Soc. 21(5): 656-661. Mar. 1916. 280,8 Am3

Reprinted under the title Some Permanent Influences of Aboriginal Culture, in Readings in the Economic History of American Agriculture, pp. 49-52, edited by Louis Bernard Schmidt and Earle Dudley Ross. New York, The Macmillan co., 1925.

The writer states that our ancestors took over the aboriginal maize culture complex, that it still survives among American farmers, and is an excellent example of a borrowed culture trait. It illustrates one of the few cases of culture transmission from a lower to a higher form of civilization. Our present mode of planting corn in hills, of cultivating the earth up around the stalks, of husking with a peg, of drying the ears hung by pendant husks, of storing in cribs elevated on posts, of planting beans and squash among the corn rows, of testing the seed before planting, of making hominy and succotash, of eating green roasting ears, and making corn mush - all these processes are taken from the Indian maize culture. Even the husking-bee which was a happy social event, has its parallel in the harvest festival of the aborigines.

396. Wissler, Clark. The American Indian; an introduction to the anthropology of the New World. Ed. 2, 474pp. New York [etc.] Oxford university press, 1922. 445 W76 Ed. 2

Bibliography, pp. 423-449.

Ch. I, The Food Areas of the New World, pp. 1-27, contains information on maize, pp. 12-25. Maize is said to be one of two cultivated native food plants which "rise to the level of chief staples." Studies by Lucien Carr and Arthur C. Parker "show how completely the white colonists absorbed the maize complex of the Indians." A map on page 20 shows the distribution of maize and manioc in both North and South America. In a section entitled General Discussion, pp. 19-25, the writer shows "how maize dominates aboriginal agriculture"; refers to studies on the subject; and discusses aboriginal maize culture, origin, etc.

The close agreement of maize culture with the distribution of pottery is briefly noted on p. 68.

On p. 184 the writer states that practically all of the following concepts are associated with the distribution of maize culture: "the family ownership of land without rights of sale or conveyance, the setting aside of plots for the rulers and religious officials, and,

finally, the constant control and supervision by those in authority."

The place of maize in the Indians' ceremonies and rituals is brought out on pp. 193-195.

The lack of correspondence between historic cultures and archaeology in the maize areas is brought out on p. 374.

The following statement is quoted from p. 381: "The author's studies of maize culture show that in this case the whole complex was carried along over the eastern maize area and, what is perhaps of more significance, almost the entire complex was taken over by the English colonists. In the Old World, where the seed alone was introduced, we do not find this complex but an adaptation of the prevailing cereal complex."

397. Wissler, Clark. Indian corn as a world food. Amer. Mus. Jour. 18(1): 25-29. Jan. 1918. Libr. Cong. QH1.N13

"Of these foods none take so high a place as Indian corn. In addition to being one of the best of the world's foods it is the one cultivated plant that seems most at home in our country. It is the greatest cultural triumph of the American race and its origination makes a strong claim to the highest place in the world's great deeds of culture... In other words, corn occupied about as large a place in the culture of the Indians as it does in our own." - p. 26.

398. Wissler, Clark. Indians of the United States. Four centuries of their history and culture. 319pp. New York, Doubleday, Doran & co., inc., 1940. (American museum of natural history. Science series) 446 W76I

Ch. III, Farmers and Potters, pp. 20-27, contains some material on the probable origin of corn, its introduction into the United States, and its place in the life of the Indian tribes.

"What we begin to comprehend is that these later Indian corn farmers were building up a mode of life, or culture, intimately adjusted to the cultivation of this grain. That they idealized the corn and their relationship to it is to their credit rather than otherwise. They even dramatized it, as in the Green Corn dance and other ceremonies." - p. 22.

399. Wittmack, L. Über antiken mais aus Nord- und Südamerika. Zeitschrift f. Ethnologie 12: 85-97. 1880. Libr. Cong. GN1.Z4

Discusses various theories as to the place of origin of maize and agrees with those who believe it to be America. An investigation of the different varieties of maize leads to the conclusion that the maize of North America is different as a rule from that of South America though there is a connection between the common variety of maize in ancient Peru and the North American flint corn of today. However, it is not taken to be proof of relationship between the early racial stocks of North and South America. On the other hand the varieties of maize grown in Mexico and Peru indicate a connection between the two countries. This is also said to be true of Peru and Chile.

400. Woodward, Carl Raymond. Agriculture in New Jersey. 144pp. New York, American historical society, inc., 1930. 30.9 W87A

"Reprinted from 'New Jersey - a history' Irving S. Kull...Editor-in-chief."

In the chapter on Colonial History of New Jersey, the author states: "American agriculture is the offspring of a union of European and Indian practices. The settlers who introduced into their farming systems the culture of native crops met with the greatest success. At least one-third of modern American agriculture, it has been estimated, is of native American origin.

"Maize, of course, was the main reliance of the Indians, as it was to become the great staple of American farmers. This without doubt has proved to be the Indians' greatest contribution to world economy. No people had made greater progress in plant breeding. They had developed numerous varieties and strains of corn adapted to differences in soil and climate." - p. 4.

In a later chapter, the writer speaks again of the importance of corn in these words: "Corn still stands as one of the most important of New Jersey's farm crops." - p. 111.

401. Wright, Mrs. Marie (Robinson). The old and the new Peru. A story of the ancient inheritance and the modern growth and enterprise of a great nation. 456pp. Philadelphia, G. Barrie & sons, 1908. Libr. Cong. F3408.W95

"Maize is cultivated in every department, and in every region except on the high puna. It may be seen growing on the plantations of the coast, in the inter-Andean Valleys, and in the Montaña, and furnishes the Indian's chief article of food and drink; the native chicha, once the favorite beverage of the Incas, is made from this product. Maize is to the Peruvian Indian what rice is to the Oriental, the foundation of his cuisine." The history of its discovery is outlined.

402. Wright, Mrs. Marie (Robinson). The republic of Chile, the growth, resources and industrial conditions of a great nation. 450pp. Philadelphia, G. Barrie & sons; London, Paris, C. D. Cazènove & son [1904] Libr. Cong. F3058.W94

"It is the small farmer who produces the greater part of the corn crop of Chile, and this is done almost entirely without machinery of any kind to facilitate the work. The annual harvest of corn amounts to about two million bushels all of which is consumed in Chile."

403. Yanovski, Elias. Food plants of North American Indians. U. S. Dept. Agr. Misc. Pub. 237, 84pp. Washington, D. C., 1936. 1 Ag84M no. 237

Literature cited, pp. 65-68.

"This publication is a summary of the records of food plants used by the Indians of the United States and Canada which have appeared in ethnobotanical publications during a period of nearly 80 years... In every instance brief references are made to the original authorities for the information cited." - Foreword.

Maize, p. 9, is one of the plants listed. Twenty-three references, most of which are listed in this bibliography, are cited.

404. Young, Alexander. Chronicles of the Pilgrim fathers of the colony of Plymouth from 1620 to 1625. Now first collected from original records and contemporaneous printed documents, and illustrated with notes. 502pp. Boston, C. C. Little and James Brown, 1844. Libr. Cong. F68.Y682

See pp. 130-134, 140-141, for the finding of buried Indian corn, Nov. 16, 1620 and for a footnote regarding the origin of corn.

"And sure it was God's good providence that we found this corn, for else we know not how we should have done; for we knew not how we should find or meet with any of the Indians, except it be to do us a mischief." - p. 141.

A footnote on p. 187 tells of the meal made of parched maize used by the Indians and called nokake.

Page 204 relates the taking of more buried corn with the desire "to make satisfaction to the full for it" if they could find the rightful owners.

The promise of restitution for corn taken which had belonged to one "Manamoick" is given on p. 217.

A statement that "we have given them full content" for corn found in caves is made on p. 235.

Double value for corn found in a cave was given to the owners - p. 259.

The planting of corn in the spring of 1621 and a successful crop, is related on pp. 230-231.

For other references see the index under subject Indian Corn.

405. [Zahm, John Augustine.] Along the Andes and down the Amazon, by H. J. Mozans [pseud.]. With an introduction by Colonel Theodore Roosevelt. 542pp. New York and London, D. Appleton and co., 1911. Libr. Cong. F3423.Z2

Bibliography, pp. 529-534.

In Ch. XIX, a Peruvian Paradise, the author writes: "Our path between Rioja and Moyobamba was over a comparatively level plain... and the haciendas exhibited broad acreas covered with maize and sugar-cane.

"The Indian corn was such as would delight the eye and the heart of an Iowa or Kansas farmer. Only once - on the banks of the Meta, in Colombia - had I ever seen a more luxuriant field of this important staple. The stalks were nearly fifteen feet high and each stalk bore two or three ears of corn. Some of them had four. So fertile is the soil and so propitious is the climate that it requires only three months from the time of planting for the maize to attain maturity. Three crops a year are common, but even four are possible. There is no fixed season for planting. The husbandman may sow and reap in every month of the year. While one man is planting, his neighbor in the adjoining field is collecting into his granary the same kind of crop. No plowing is necessary. When a clearing is effected, all that is necessary is to make a hole in the ground with a pointed stock and deposit the seed. Three months later, with but little care, the field is ready for the harvest." - p. 385.

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